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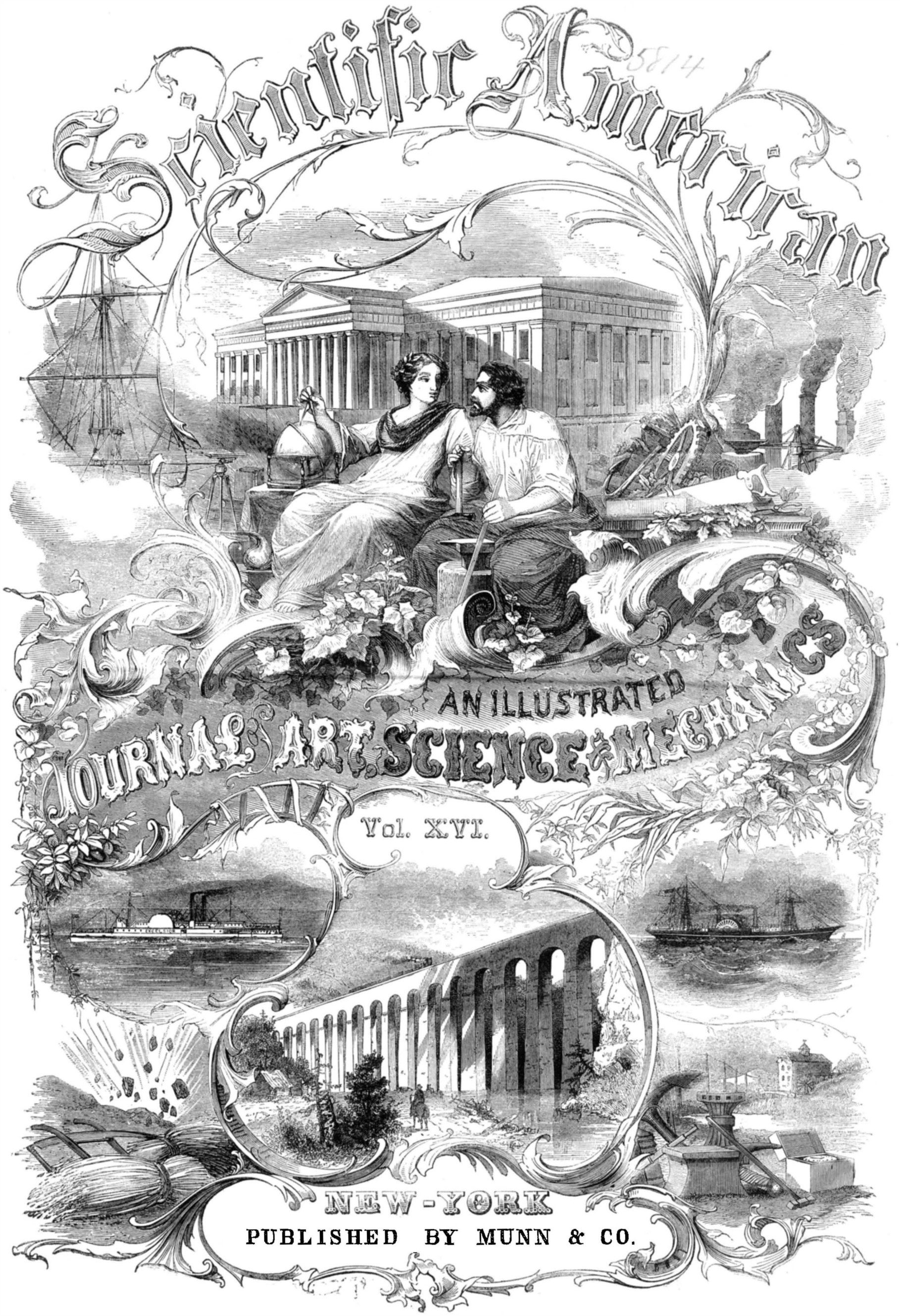

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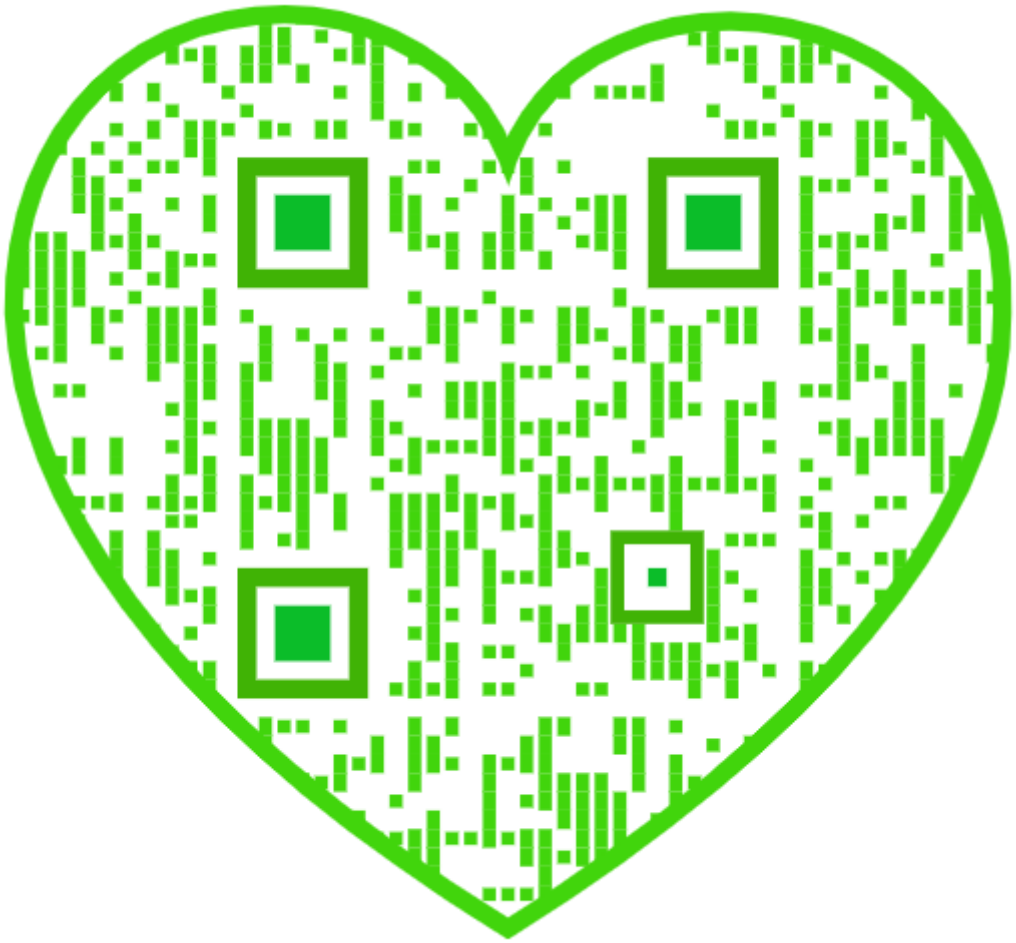

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THE PNEUMATIC DISPATCH.

The growth of the business and population of New York City is wonderful. Twenty years ago we numbered less than 400,000 inhabitants, while to-day we have nearly 1,000,000, and if the same ratio of increase continues for twenty years longer, we shall then count 3,000,000. Already our streets, spacious compared with many large cities, are over-crowded; public conveyances impede each other, and can only travel at slow pace. The carrying traffic has become so enormous, the number of men, horses, and vehicles so great, that they frequently blockade the streets, move with difficulty, and of necessity their charges are high. It costs more to carry a barrel of flour one mile within the streets than to transport it hither from the mills, distant two hundred miles.

The city postal service, excellent in some respects, fails to afford a tithe of the assistance it is capable of rendering in the transactions of ordinary business. No person expects promptness in the delivery of city parcels and letters: as for out-of-town mails, letters fail to go unless they reach the General Post Office down town, from one to two hours prior to the departure of the car or boat.

The need of some method of relieving the streets and affording to the public more abundant, quicker, and cheaper means of local communication, was never more pressingly felt than at present.

We are glad to observe that a movement is being made which promises something practical in respect to the faster conveyance of passengers. We understand that the Senate Committee of the Legislature has decided to report in favor of a tunnel passenger railroad to extend from the southern extremity of the island under Broadway, with branches under Third and Eighth Avenues, to Harlem River, a distance of eleven miles.

Of still greater importance to the material prosperity and business convenience of the city, is the introduction of an underground method for the safe, prompt, and economical conveyance of all kinds of freight, goods, parcels, and the mails.

To this service the Pneumatic Dispatch system is admirably adapted, and to some of its practical uses we propose now to direct the attention of our readers. The system of communication now generally known as the Pneumatic Dispatch, consists in the employment of a closed tube through which air is driven or exhausted, by means of steam power and blowers of large dimensions. Cars or trucks closely corresponding in form to the shape of the tube are employed therein to carry freight, and these are sucked or blown along, from station to station, literally with the speed of the wind. The Pneumatic Dispatch is now employed in London, with complete success. By it freight, mail bags, etc., are transported with a velocity of 30 miles an hour, up hill and down, around the sharpest curves, with great economy. A velocity of 50 or 100 miles, or even more, per hour, may be obtained if desired, by simply burning more coal and driving the blowing machinery faster.

The Pneumatic Dispatch system is also well adapted to the propulsion of passenger cars, and for city use it is probably more economical and safer than any other known means. The superior economy of stationary engines for steady work is well known. Between pneumatic trains there can be no collisions; the same current drives them all; if one train stops on the track, no other can approach it; no engineers and firemen are required on the cars; no gas or smoke is evolved; the tunnel and cars are constantly supplied with moving fresh air; the cars run with peculiar steadiness, without any jerking at the start or stop. With an atmospheric pressure of only 2½ ounces to the square inch on the rear end of the car, a velocity of 25 miles an hour is obtained. The use of the pneumatic passenger cars in London established these facts long ago.

We have selected for illustration in connection with this subject, the application of the Pneumatic Dispatch to the city postal service, from designs by Mr. A. E. Beach, of the SCIENTIFIC AMERICAN. Engravings of the driving machinery and valve arrangements are reserved for future issues.

The engraving herewith presented is an interior view of a supposed Pneumatic Dispatch Station. Passing through the apartment is seen the main pneumatic tube, *g*, having side switch tubes, *h*, through which the pneumatic cars enter and leave the station. Each car on emerging from the switch tube is carried by its momentum across the floor into a short tube, *h'*, which serves as an air cushion and gently arrests the car.

The automatic letter-distributing mechanism is seen in front. The packages and letters destined for different city stations are placed by the attendant in the rotary letter and parcel boxes, A B C, which indicate the stations to which the packages are to be conveyed and delivered. The pneumatic car is divided into compartments corresponding respectively to the boxes, A B C, and when the car passes through the tube under these boxes, a pin, *b*, upon the car, strikes a projection, *a*, upon the blade of each rotary box and causes it to turn upon its axis far enough to compel the contents of the box to fall into the car beneath. Each box is similarly operated by a separate pin, *b*, and thus the contents of the several boxes at the various stations on the route are successively transferred into their corresponding car compartments, without any stoppage of the car. When it is desired to send the cars through the tube without operating the boxes at the stations, it is only necessary to remove the pins, *b*.

The delivery of the contents of the car at the appointed stations, is accomplished by opening the car bottom, each compartment bottom, *f* being hinged for that purpose. On reaching station A, for example, the rod, *e*, which rests upon the car bottom, and projects above the top of the car, will come in contact with an inclined lug, fastened in the roof of the tube, *g*, which lug will depress the rod, *e*, and cause it to

APPLICATION OF THE PNEUMATIC DISPATCH TO CITY POSTAL SERVICE.

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open the bottom of compartment, A, and the contents thereof will drop out, through an opening in the bottom of the tube, upon a table, or other receiver, within the station. A similar transfer takes place at each station from each car compartment corresponding to that station, without stoppage of the car. By this simple means the collection, transportation, and delivery of letters and parcels, may be automatically effected throughout the entire city, with extraordinary rapidity, safety, and economy.

The delivery of the contents of a car upon the table of a station is illustrated in the large engraving on page 8, at the right, where the main pneumatic tube passes through the basement. In the Receiving Office above is a series of slides or tubes which communicate respectively with a series of rotary letter boxes, A B C D E F, mounted upon the main tube below. These letter boxes indicate so many stations to which letters are to be sent, and they are distributed by the attendant into the slides, A B C D E F, down which they fall into the letter boxes where they remain until a car comes along, which takes them out and carries them to their several destinations, in the manner before described.

In the foreground of the picture is a lamp-post letter box, and under its base are two rotary boxes, one for up-town letters, the other for down-town letters. The pneumatic cars are intended to pass under these lamp-post letter boxes, to collect and carry the contents as already described.

By the use of the Pneumatic Dispatch letters and parcels may be collected, conveyed, and delivered, from and between all stations and lamp posts below 42d street and the Post-office, Nassau and Liberty street, in six minutes, distance 3 miles. Letters deposited in any pneumatic post or station, in any part of the city, 15 minutes before the departure of any mail, will be in time for such mail. Messages, letters, and parcels could be sent to any address, up or down town, and the answer returned, all within an hour's time, or even less.

Among the first results of the introduction of the Pneumatic Dispatch, in connection with the postal service, would be an enormous increase in the number of letters sent. It would soon become the great popular means of communication, a sort of Hermes, or winged messenger, employed by the gods, as we read in ancient mythology, but in these modern times transferred to the service of the sovereign people.

Independent of the postal service, which of itself would bring in an immense revenue, and soon repay the cost of construction, the additional existing business which the Pneumatic Dispatch would command at once in the city of New York, by its unapproachable cheapness and facility, is something remarkable. We have been at some pains to investigate the daily movement of packages and parcels through our streets, and the result, we think, will surprise those who are best acquainted with the business.

There are two or three leading Express Companies which collect and distribute three or four thousand packages each per day; each employing from fifty to a hundred horses and as many men. But these mammoth establishments take up but a drop of the flood, comparatively. We have at least a dozen important express lines to the interior, constantly employing in our streets an aggregate of nearly a thousand men and horses, in the collection and distribution of not less than fifteen thousand parcels of all sizes per day. But the City Express system is entirely additional to this, and twice as large. All the out-of-town express matter is collected and distributed here by the companies without charge to their customers, and consequently pays no license fee to the city. But the number of licensed express wagons doing business for hire within the city is over eleven hundred; and their daily parcels must exceed thirty thousand, if each wagon be allowed only thirty calls per day, which would barely support man and horse. Again, this does not include the suburban express wagons, which are licensed in their respective localities, although their business is wholly to and from this city, and of which some two hundred and forty come over every day from the city of Brooklyn alone. Jersey city, Hoboken, Hudson city, Weehawken, Newark, Staten Island, Flushing, Astoria, Jamaica, Flatbush, and many other places, send in their full quota of daily express wagons; so that five hundred suburban expresses, with their fifteen thousand daily parcels, must be considered a very moderate estimate.

But all this is a sort of excrescence, the growth of a few recent years, upon the main body of our system of street transportation. The public cartmen number upward of 7,000, with 275 public porters. Of the private carts and wagons belonging to our wholesale merchants, manufacturers and large retail houses, we can only make inadequate conjectures, so as to be within bounds. Of our 8,000 wholesale merchants, at least 1,000 have their own carts. The manufacturers, who, for the most part, cannot dispense with private wagons, cannot possibly have less than 2,000 of these in motion. Here are ten thousand vehicles in the wholesale way. Then we have 17,000 retailers and 11,000 in mechanical trades. Of these, some 3,000 grocers, and 2,000 butchers and bakers, must have, nearly all of them, wagons, for the collection of their numerous daily supplies of goods or materials, as well as for distribution to their customers. Allow them 4,000 wagons, and let the other 12,000 retailers have 1,000 more. Total of public and private business vehicles, 15,000, besides expresses. Give them a low average of thirty parcels per day—many of them carry hundreds—and we have a total movement of 450,000 parcels. To these add 15,000 out-of-town express parcels, 15,000 suburban, and 30,000 city, and we have a total of 510,000 per day.

Half a million of parcels and packages already passing through our streets daily by horse-power—to which we might fairly add a hundred thousand more by hand—furnish the existing basis of business strictly legitimate for the Pneumatic Dispatch, and capable of being transacted by that agency at a decisive saving in cost. The latter fact will be apparent on a simple calculation. The cost of a horse in this city, well cared for, is found by accurate account, to be about sixty-five cents per day. The wages of employees are about three dollars, and the earnings of cartmen five or six dollars at the lowest. Allow the men an average of four dollars, and let the wear of wagon and harness, with the expenses and wear of the horse, make up one dollar a day. Too little, every one will say: but here are over 17,000 horses, as many wagons, and as many men, maintained at a minimum cost of $85,000 per day, which is an average cost of seventeen cents for every one of the half million parcels they are supposed to carry. Of course the *price* paid, directly or indirectly, must be higher. Any one generally acquainted with such prices in the city, will admit that twenty-five cents would be a medium estimate for the average.

Reduce this price to an average of ten cents, which would be a lucrative rate for pneumatic transportation, and you have instantly the proper condition for doubling the business; which the quickness, certainty and facility of the new method would soon double again.

Again, as to capital: here are 17,000 horses worth on an average $300 each, and as many wagons and carts (leaving the more expensive double wagons out of the account) worth an average of $200 more; making a total capital of eight and a half millions of dollars invested in this business, in the form of horses and vehicles alone: enough to extend the pneumatic system through every thoroughfare of the city twice or three times over.

Photographic.

The large and splendid engraving of the Scientific American Office which covers page eight of this paper, is from an admirable photograph by Rockwood & Co., 839 Broadway, whose excellent capabilities we have before had occasion to notice. Every branch of photographic art is carried on by them in superior style. We have before us a specimen of life size portraiture which in its fine execution does them the highest credit. It is a solar camera enlargement from a two inch negative. We called attention not long ago to the photo-medallions produced by Messrs. Rockwood. These are raised or medallion portraits, similar to cameos, produced by the aid of photography, with all its life-like accuracy. The likenesses thus made are said to be marvellously correct.

Some very curious applications of this Photo-Medallion process are described in the *Photographic News*. They consist in what are termed "Micro-Photo-Sculptures," or enlarged images in bas-relief of microscopic objects, the material being plaster of Paris. Nothing can exceed the delicacy, sharpness and perfect rendering of these reliefs, which give, practically, an enlarged model of the original object. The tongue of a cricket is the most perfect of those before us; the tongue of a fly is also exceedingly good; a flea is from a somewhat imperfect negative, and lacks crispness; but this is in nowise due to the process. The perfection of the modelling depends, of course, on the perfection of the definition in the negative; and the amount of relief, other things being equal, on the intensity of the negative; although this may be considerably modified by management in the manipulation. Those before us are on round tablets about three inches in diameter, the amount of relief resembling the thickness of a skeleton leaf.

The result is exceedingly beautiful, and it is probable that the principle upon which they are produced will find other applications. It is only necessary to remark that it is imperative that the subject to be reproduced should be semi-transparent, and admit of being photographed by transmitted light, so as to secure the relations of form in a relief so produced.

How to Intensify Negatives after they are Varnished.

Hughes says:—"When a negative has been once varnished, its character is supposed to be so settled that it is beyond the reach of alteration or improvement. It is certainly the best plan so to consider it; yet sometimes a negative becomes so weakened in the varnishing as to cause great disappointment. It is a consolation to know that a negative need not be given up as hopeless, even under these circumstances. The method of proceeding is to make a "negative intensifying varnish" by adding tincture of iodine—alcohol one ounce, iodine ten grains—to any good negative spirit varnish, until of a very deep sherry color. Label the bottle and keep it for special use. When a negative prints weak and without sufficient contrast, re-varnish with this varnish; pour on in the usual manner, allowing a few seconds for the yellow varnish to penetrate the film, and dry by heat in the usual manner of varnishing the plate. The negative will be found to be changed to a more non-actinic color that will take longer to print, and will produce a more brilliant impression on paper. Many weak, thin, foggy negatives may thus be made to produce passable prints. It is well to keep two varieties of this yellow varnish—one, of an ordinary sherry color, for negatives that only want a little intensifying; and another with a very deep port-wine color, by adding a greater quantity of tincture of iodine, and using this latter for negatives that are very weak and gray. Used with care and judgment, there is no question but that these varnishes will be found extremely useful in every photographic laboratory.

"A varnish of this character may also be used with advantage for varnishing the plate in the first instance, if the negative is found to be not quite intense enough, as the iodine in the varnish unites with the silver deposit, and makes the deposit much more chemically opaque than the ordinary varnish, thus increasing the intensity of the negative.

"It is scarcely necessary to say that judgment must be exercised in employing these expedients, and though useful in cases of extremity, they should never be considered as the regular practice."

Glycerin for Preserving Wet Plates.

In photographing interiors, where very long exposures are necessary, and in taking landscapes at a considerable distance from the dark room, we all know how difficult it is to keep the film from becoming surface dry. The partial drying of the bath solution on the surface is apt not only to give rise to various kinds of stains, but also by concentrating the nitrate of silver, to weaken the sensitive medium considerably by dissolving the iodide of silver which it contains. Next to the nuisance of having to use tents, etc., this is one of the most annoying shortcomings of the wet collodion process. Many schemes have been devised and recommended for at least mitigating the evil, but all of them hitherto described seem to entail a considerable loss of sensitiveness.

The process we would recommend is the following:—

Use the ordinary bromo-iodized collodion and silver bath. When the plate has been sensitized and is still moist, pour on and off several times, until all traces of greasy lines have disappeared from the film, the following solution:—Pure glycerin, one oz.; distilled water, one oz.; thirty grains nitrate solution, one oz.

The plate when thoroughly soaked with the above solution, should be allowed to drain on blotting paper for several minutes before being placed in the dark frame. It will retain nearly its primitive sensitiveness for four hours, probably much longer, but we have not tried to find the limit to its keeping properties. The development is, as usual, either with protosulphate of iron or pyrogallic acid.

Glycerin, it is well known, is oxidized by rather strong nitric acid into oxalic and glyceric acids, with the formation of some other compounds of less importance, but these reactions take place only after a considerable time has elapsed. From this it has been surmised, and therefore recommended, that the nitrate bath for this process should be acidulated with acetic instead of nitric acid. From our experience it appears that the slight trace of nitric acid in the bath has little or no effect on glycerin; in fact, such a bath answers at least quite as well as one acidulated with acetic acid.—*British Journal Photography*

Leptographic Paper.

This is the name given to a species of new photographic paper which is prepared by a company in Paris, and sold ready sensitized, at a comparatively low price. We hope it will be introduced here. It has been examined and experimented upon by many of the leading photographers in France and Great Britain, nearly all of whom speak well of its practical uses. It consists of the ordinary paper upon which a sensitizing collodion or film has been poured and dried. Exactly what the film is composed of does not yet appear. It was at first supposed to be nothing more than paper covered with collodio-chloride, as in Simpson's process; but the Leptographic film seems to be different from that, as it is more insoluble, keeps better, is harder, etc.

The Leptographic paper possesses some very peculiar and valuable qualities: "The paper being prepared beforehand and properly protected from the light, is ready for use at any moment; it may be left, indeed, in the printing frame, if the weather is unfavorable, and then exposed again two or three days afterward, in order to finish the impression already commenced, and all this without any inconvenience or detriment to the whites—a convenience which is very agreeable, and which occurs with no other paper. It has been demonstrated by experience that this paper is as sensitive at the expiration of half a year as on the day of its preparation.

Yankee Enthusiasm.

"We have always thought the Scientific American a very useful and instructive paper. We only learned by the last mail from New York that it merits comparison with the sacred Bible. If well-conducted trade papers are to reach such a standard of purity and excellence, what a glorious destiny is in store for *The Grocer!* It and its editor may hope some day to be canonized This is a part of a letter addressed to the Scientific American, and published in the last number:—

I think a great deal of the Bible and its truth. I can read it over and over, always finding something new and instructive. I really think it is the same with the Scientific American. It is suitable for all, rich and poor. By it even ministers of the Gospel will find they can be interested and instructed.

We may add in serious mood that if the Scientific American has the misfortune to possess among its many thousand subscribers even one such blasphemous fool as the man who wrote the above, it says little in favor of his sense of decency to give vent to his mad ravings."

[We copy the above peculiar paragraph from the *Grocer*, a weekly journal published in London. We can assure the Editors that they will never be canonized so long as they encourage the sale of "pork sausages" and "Old Tom Gin."—Eds. Sci. Am.]

Underground Railway.

The Senate Commission on Railroads, in the city of New York, unanimously adopted a resolution in favor of one line of underground road from the Battery to the City Hall Park, under Broadway, with one branch connection under Chatham street, Bowery, and Third avenue, to the Harlem River; another running on the west side, under Park place (or Murray or Warren streets, or by the most feasible route) to Hudson street, thence under Hudson street to Eighth avenue, thence under Eighth avenue to Broadway, thence under Broadway to Ninth avenue, thence under Ninth avenue to Harlem River.

The line under Broadway, between the Battery and City Hall Park, to be constructed only as part of one or more of the through lines.

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Miscellaneous Summary.

THE TRICHINÆ excitement has died out—not so the trichinæ. Victims *a la* king Herod continue to be reported. Miss Lida Jordan, of Maine, Iowa, recently died of trichiniasis, having eaten of diseased pork last spring. On post-mortem examination, her flesh was found to be filled with the worms. "Hog Cholera" (as the disease is called in the animal) is raging throughout Illinois and northern Kentucky, and defying all remedies. A western carcase apparently healthy and unusually fat, was examined in Oswego, a few days since, revealing millions of trichinae in a mouthful (!) of fat, varying from atoms scarcely perceptible to worms two inches long. The *Palladium* describes them as of a greenish yellow color, resembling in shape a needle pointed at both ends. The practice of allowing swine to feed upon the flesh, offal and excrement of animals, is the source of the disease. The trichina egg never developes to a harmful stage while passing naturally through the intestines. It must be eaten, and thus harbored and nourished a second time, in order to reach its boring and destructive stage of growth. It is a penalty of confederate greed and filthiness in swine and their owners.

THE proportion of wood-land required for an agricultural country, to secure a regular and sufficient rain-fall without violent storms, is an interesting subject of scientific inquiry. Inestimable benefit would result to the material interests of our country, if this proportion could be ascertained and in some way secured by legislation, in each of our several descriptions of territory. The quality, pitch and elevation of the land, with the influence of mountains and seas, as well as climate, are among the conditions to be taken into account. Rentzsch calculates 20 to 23 per cent of forest as necessary in Germany; while 5 per cent would suffice for England, and Sir Henry James considers half that proportion sufficient.

MANGANESE.—Mr. Charles T. Girwert of Rienzi, Mo., responds to the enquiry of a former correspondent relative to the black oxide of manganese. One of the richest and perhaps the softest species of this ore ever found, was discovered in Arkansas, just before the war, by an English proprietor of manganese mines in Germany. This gentleman was induced by a statement of the late geological surveyor of Arkansas, to come over and search for a conjectured deposit near Polk's Bayou. It was found, in the mountains to the left of Law's Creek, which empties into Polk's Bayou about two miles from Batesville, and pronounced by the discoverer superior to any that he had ever worked. There is a good deal of the harder species in Independence county, especially on Lafaty Creek.

PROF. FARADAY has demonstrated that the electricity evolved during the combustion of a few grains of charcoal or a common candle, would, if arranged in a continuous circuit, exceed that of the most powerful batteries. The theory is that the heat generated by combustion is owing to the union of the two electricities. If a key to this source of power could be discovered, a new career, almost, would be opened to science and mechanics.

IMMENSE deposits of fluor spar, fine-grained and closely resembling indigo, have been found on the James river, Colorado. It is suggested that these deposits may become valuable for the purpose of dissolving quartz in fluorine.

THE posts used by the French Telegraphic Company are carbonized at their ends, for the sake of preservation, by an enveloping jet of flame, from a new machine invented by M. Hugon. The Paris and Orleans Railway Company carbonize their sleepers or ties with this machine, at a cost of only about one centime each, or less than one-fifth of a cent. The same inventor applies his jet of flame (driven by a blast of compressed air into which drops of water are injected) to the blasting of hard rock. However useful this new application of a primitive agent might be in open excavations, it must be extremely difficult if not impracticable in tunnelling.

THE Federal Government of Switzerland, encouraged by the successful rectification of the course of the Rhone, have resolved upon the rectification of the water-courses of the Jura. The method proposed, is to lower the level of the lakes, and the object is, to produce a sufficient fall for the drainage of the water from some 45,000 acres of marsh-land in their neighborhood. It is expected that the value of these lands will thus be increased more than $3,000,000, at an outlay of about half that amount.

A FRENCH inventor, M Boue, proposes to patent an invention of durable cast-iron molds for castings. To prevent the rupture of the casting by contraction under rigid constraint, he lifts the upper mold box immediately after running in the metal. This is unnecessary, however, in casting simple hollow forms, if a soft core of the usual kind be employed, as the contraction is exerted in a direction from the circumference to the center.

THE Canadian Parliament has recently enacted a law requiring the doors of all buildings used for public assemblages to open outwards, to prevent the danger of their being closed and fastened by the pressure of a crowd within, in case of fire or other alarm.

THE Canadian city of Coburg is brilliantly lighted with gas from pine stumps, bones, and other vegetable and animal refuse, at a reduction of one dollar per 1,000 feet from former prices. The works are also much cheaper than those required for coal gas.

THE electrical fuse for firing blasts, is in very satisfactory use in Europe. The engineer at the Ast tunnel, (Innspruck and Bozen railway) states that 30 holes of great depth have been blasted simultaneously by this apparatus.

THE centrifugal pump, (an American invention) is taking the place of all others for heavy pumping, in England.

REPEATED efforts have been made of late years to adapt wood for use in the soles of shoes, but as yet without flattering success. One manufacturer succeeded, just before the war, in starting a considerable southern trade in wooden-soled shoes for the negroes; but the manufacture has not been resumed. In this instance a sole of maple was fastened to the upper with screws. A patent was obtained, a few years since, for a compressed wooden sole. This has been abandoned. A company in New York have lately been manufacturing a shoe with soles and heels of maple, and the shank of leather; securing the upper to the sole by a thin rim of iron clasping the edge of the latter. A recent Boston invention fastens a shaped maple sole to the upper by means of staples. It is in use among the fishermen.

Dr. Burggraeve of Ghent has recently published a method of dressing wounds with sheet-lead. After carefully washing the wound, the lacerated parts are drawn together and held in position by very thin strips of the metal, attached by sticking plaster. This permits a jet of warm water to be thrown under the armor from time to time, to cleanse the wound and refresh the parts. In cases of injury by machinery and gunshot, such dressing may often save a limb or even a life.

PEAT IRON.—The Montreal *Gazette* notices the first bloom made in that part of the world with pure peat fuel, and pronounces it of the very highest quality, equal to the best Swedish iron. The bar was bent cold by a vice, and doubled up close at right angles with an edge, without a crack or flaw appearing, the outer corners remaining smooth and sharp: a test which it is said no coal-iron made in Canada will stand. The fact is of great importance to Canada, in view of her large supplies of peat and iron.

A NEW process is proposed for making wrought-iron, which, it is claimed, will save seventy-five per cent of fuel, and nearly all waste of metal. The ore, crushed and cleaned, is placed in the furnace, inclosed in sheet-iron canisters, and kept exactly at a reducing heat until de-oxidization is completed, when the heat is raised to the welding point, and the canisters are treated in the same manner as puddle balls. The operation occupies four to six hours.

AN English inventor proposes to diminish the expense, danger and other disadvantages of distilling petroleum at a high heat, by removing the atmospheric pressure and applying the heat of steam. The intermixture of deleterious gases and offensive odors in the product of evaporation, is avoided, as well as the burning and deterioration of the residuum. The invention is an American one, having been patented here some time since.

JOHN HOLLEY, of Blackwell, England, has invented a railway brake, the wheel of which presses against the traveling wheels of the car, giving it great velocity, and winding up the chain that operates the brakes. The *Engineer* says:—"We have examined the model and are disposed to think favorably of the invention."

A JET of vapor of ether is now thrown upon parts subjected to surgical operations, by an instrument made for the purpose, producing insensibility of the part in from two to four seconds. The patient becomes a spectator: "merely this and nothing more."

THE postage stamps consumed annually in the United States amount to 350 millions, in France to 450 millions, and in England to 800 millions. The French contractor makes a million and a half per day for the government at 90 cents per 1,000. To prevent lithographic forgery, the paper is first covered with a sort of transparent ink, the composition of which is a secret, so that both inks, the transparent and the colored, would stick to the stone, if an attempt were made to transfer the design. After printing, certain specks of color are also laid on with a brush, by hand.

THE statistics for 1866, amassed and presented in the Senate by the friends of Colorado as a state, show a tax valuation, exclusive of mines, of over ten and a half millions; Internal Revenue to the amount of $141,368; 251,000 acres of public lands entered for actual settlement, against 140,000 last year; postal receipts more than doubled in a year, and exceeding those of certain of the states; 250 new buildings costing $476,000, in Denver city, alone and an exchange business of nearly $12,000,000, transacted by a single bank which is not far ahead of several others. The population is estimated at 60,000.

THE market value of skilled and educated labor in glass and iron, is enormous. In the window-glass factories of Pittsburgh, for example, blowers and flatteners receive $250 per month, and the more skilful make as much as $20 per day, and that for long periods. Some of the melters in the steel works clear from $20 to $22 per day.

THE sale of horseflesh is increasing in Paris. There are now seven butcheries in that line, disposing of about 40,000 pounds per week, at from five to nine cents per pound. We presume that Americans who visit Paris next year will be largely fed on horse steaks, horse hash and horse sausages.

AN emigration of Chinese farmers of the better class, has begun to arrive in the Sandwich Islands. A Honolulu paper thinks it not unlikely that the Chinese element may in time supplant the native race with a new and superior stock.

CALIFORNIA petroleum is now refined in San Francisco, said to be of as good quality and at as low prices as in the eastern states.

THE Codfisheries of the North Pacific are attracting attention in our Pacific States, and promise to become important.

THE curious fact has been observed by means of the microscope, that perforations made by the electric spark are uniformly pentagonal in form.

Life Boats and Life-saving Tackle.

The natives of the East and West Indies, of portions of South America, and of the Pacific Islands, employ a peculiar style of raft for passing through the heavy surf of the coast, either when fishing or landing the cargoes of outside vessels. The principle of the catamaran has been made use of, by Captain L. F. Frazee, in constructing a life-boat combining so many really excellent features, that the inventor merits the lasting gratitude of the sea-faring community.

The value of this life-saving raft was well tested on the 6th inst., at an official trial made under the direction of a committee appointed by the United States Board of Supervisors of steamboats, at their annual session in Buffalo. The beach at Long Branch was selected as the scene of operation, and thither the commissioners and invited guests were conveyed.

Constructed on the duplicate principle, the boat or raft requires neither davits nor tackle of any kind for launching, but is thrown overboard directly from the deck of the vessel, and righting itself immediately, whichever side turns uppermost, is ready for use. The buoyant power resides in two cylinders of galvanized iron, each twenty feet in length, divided into forty air-tight chambers, capable when combined of supporting a dead weight of twenty thousand pounds exclusive of itself. The central compartment is a trench some two feet in depth, designed to hold the oars, mast and all necessary equipments. Water-tight lockers adjacent, are for the storage of bread and water: at each end there is a movable or flap bow which can be adjusted so as to break somewhat the force of the waves.

This, the third public trial, proved as eminently successful as the preceding had been. With sail set, the craft proceeded from the steamer safely through the heavy surf, and returned entirely uninjured by the hazardous voyage.

The succeeding experiments with boat-detaching apparatus were hardly less important. Boats lowered at sea are always liable to capsize, either on account of getting foul, or the bow or stern may be lowered too fast, or those on board may be thrown to one side by the rolling of the ship. To detach both ends from the tackles simultaneously is the object of the several devices experimented with at that time.

A law passed by Congress in July last, requires that all vessels carrying passengers shall be provided with a disengaging apparatus whereby boats may be launched under speed or otherwise, and to be operated by one man. The same principle was employed in each of the five devices exhibited, differing only in mechanical arrangement. The boats were dropped from the davits, when the steamer lay at anchor, also when under full head of steam, and the trials one and all proved entirely satisfactory.

Trades Union Terrorism.

The contract between the management of trades combinations among our own mechanics, and the course of proceedure permitted if not authorized by those in England, received a marked exemplification in Sheffield last October. We have refrained until now from referring to the facts, hoping that evidence would be adduced to prove that the unions had no hand in the outrage. They have not, so far, succeeded in clearing their skirts of suspicion, and the matter is to be investigated by a parliamentary commission, at the urgent demand of the accused organizations.

The circumstances were these. On the morning of Oct. 8th, a can filled with combustibles was thrown into the cellar of a house occupied by a man who had rendered himself obnoxious to the union by his refusal to become identified with it. He and his family narrowly escaped from the building with their lives. The *Ironmonger* says:

It has been very clearly shown that a system of almost unheard-of terrorism has existed among the working classes; and not only have non-union or defaulting members been subject to insult and abuse, but they have been put to considerable pecuniary loss. Scores of cases have been cited in which such men have been applied to by the officials of the union for their "natty money," and on their refusing to pay it, their employers have been requested to assist the union by exercising a little gentle pressure on such defaulters. Non-compliance by the employers has almost invariably been followed by the missing of the tools, wheelbands, or some necessary article belonging to the men who would not pay. It has also been proved that on arrears being paid, a note would be received from "Mary Ann," informing where the missing articles were to be obtained. This practice has prevailed to a very large extent, and so secretly have these proceedings been conducted that any criminal prosecution has been most exceptional.

It is to be regretted that even in this country occasional attempts at coercion have been made during the progress of strikes; but it is honorable to the masses of our mechanics and laborers that they have always expressed their detestation of such measures in unmistakable terms. The organs of our workingmen have, without exception, sustained the right of individual opinion and action, while declaring the right of association for procuring better terms and improving the condition of labor; a right which cannot be denied.

But the system of petty tyranny, which, according to the *Ironmonger*, is common in England, will not advance the interests of those in whose behalf it is undertaken. For the credit of labor in general, and for the benefit of workmen the world over, we hope the proposed investigation will exonerate from all blame and suspicion the organizations whose interests are thus jeopardized by the villainies of unworthy hangers-on.

STEEL RAILS FOR AMERICAN RAILROADS.—*Engineering* says that Charles Cammell & Co., of Sheffield, have received orders for 28,000 tuns of Bessemer rails—many of these orders being from America, for the Erie, New York Central, Pennsylvania Central, Boston and Worcester, Boston and Providence, and other lines.

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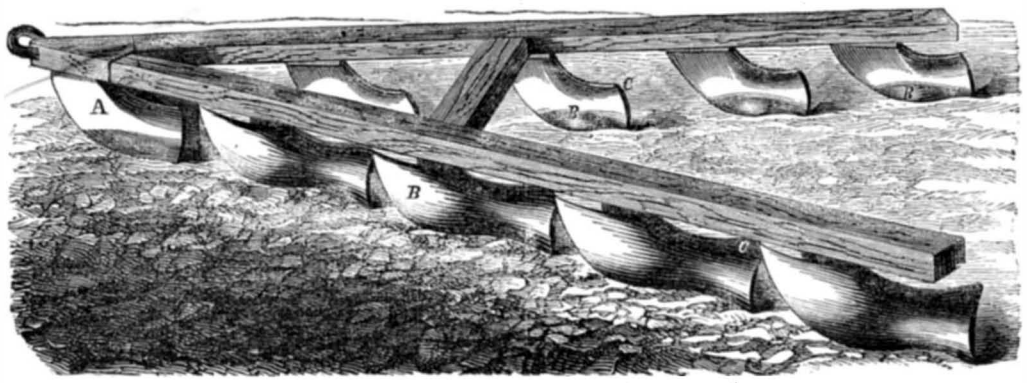
Patent Plow Harrow.

In some respects this harrow is a novelty. Harrows with teeth or blades similar to the mold board of a plow, have been in use for years, some so formed as to keep the blades beneath the surface, loosening the soil to a considerable depth. The one here presented differs from others in having the additional advantage of reversing the soil thus lifted, exposing the earth to the action of sun and air.

The frame of the harrow shown in the engraving is of the usual form, the teeth being secured to the under side of the diverging bars by flanges and screw bolts. The front tooth, A, has two wings precisely alike, and is shaped so that the knife edge penetrates the soil with a drawing stroke, and the



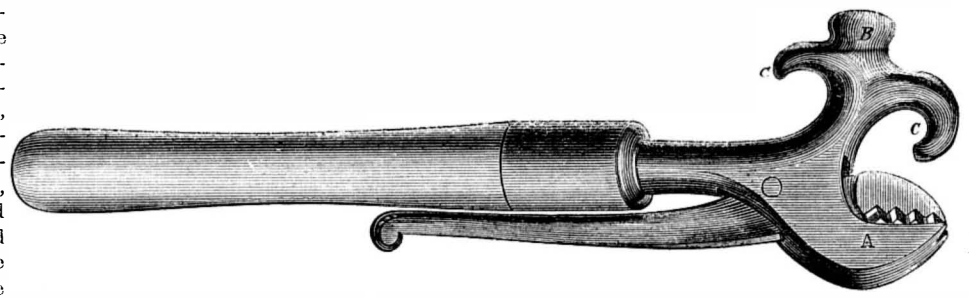
AYRES'S IMPROVED HARROW.

blade is held under the soil by the curve of the wings. Each flank tooth has a similar receding knife edge and is curved two ways. The front curve, B, goes under the soil and the upper rear curve, C, turns and throws the lifted soil downward, completely reversing the soil and thoroughly mixing it. This implement is also effective as a cultivator, as the teeth are so placed that every portion of the soil, the whole width of the harrow, is effectually pulverized. The form of the teeth offers but little resistance, so that the power required to draw it is less than in many other harrows.

Letters patent were granted for this device to Jonathan Ayers, on the 10th of July, 1866. All applications for further details should be made to A. R. Ayres, Canterbury, N. H.

Improved Combination Tool.

The term "Yankee Notions" has been applied to many simple, but very effective devices, designed to lighten labor and conduce to the comfort of the race. These "notions" are often very valuable. The engraving herewith presented shows one of these handy combination implements, simple in construction, cheap in price, and effective in operation. It is a combination of hammer, pincers, nail-drawer, tongs, and hooks, and can be applied to varied uses about the house. The jaws, A, are intended to pull tacks and nails, to grasp covers of stoves, handle cooking utensils, etc. The hammer, B, is for driving tacks, and the hooks, C, for lifting pots, kettles, sad-irons, and other household appliances. The working part is of iron and the handle of wood.



LONGSHORE'S HOUSEHOLD IMPLEMENT.

It was patented through the Scientific American Patent Agency, Oct. 23, 1866. For rights and for the article itself, apply to J. C. Longshore & Brother, manufacturers, Mansfield, Ohio.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

Reported for the Scientific American.

The regular meeting of this branch of the ~~American~~ Institute, was held on Thursday evening, the 13th ult., Prof. Tillman presiding.

COSMOGONY.

On the creation of the universe, Dr. Vander Weyde made the following remarks, illustrating his views with numerous experiments.

Modern discoveries of the correlation of forces have elevated the hypothesis of Laplace, to a theory. As now accepted, this nebular theory holds, that all atoms in the beginning were diffused through infinite space, but by the action of gravity collected and arranged around different centers of attraction, they now constitute the millions of suns, and the planetary system.

When any substance undergoes a diminution in volume, there is a development of heat: hence it was evident to the Russian astronomer Maedler, thirty years ago, that the enormous gravitation of the sun's mass, and the resulting compression of all its constituent parts, must have developed light and intense heat.

Nearly a century ago, the French naturalist Buffon, and more recently Bischof, made a series of experiments with cast iron balls of varying sizes and heated to a white heat, seeking to establish some law of relation between size and the time requisite to cool through a certain number of degrees. From the results of these experiments the conclusion is deduced that millions of years would be required to cool to any perceptible degree, a body as large as our sun, if once in a white hot state.

Experiments prove that no motion can be obtained without generating heat. By the aid of Melloni's thermo-multiplier it is shown that even a leaden ball cannot be dropped on the floor from a hight of a few feet, without raising its temperature. The effect then, caused by the falling of the myriad masses, through space millions of miles in extent, and with inconceivable velocities, must be a rise in temperature, of which we can have no apprehension. This force is now radiating into space, and giving back slowly, in the form of caloric and luminous undulations, a part of the power created by the falling down or coalescence of the masses. But a small fraction, less than one ten-thousand millionth part, of the waves from the sun ever reach our earth, but this amount, it needs no explanation to show, furnishes the true and only source of all motive powers employed by man, whether steam, wind, water, or muscular power.

As proof of the intense heat of the sun, the spectroscope shows that substances solid on our earth, such as zinc, sodium, potassium, nickel, copper and even iron, exist on the surface of the sun, only in the state of vapor.

OCEAN AND AIR CURRENTS.

In reviewing the theory of Prof. Grimes, the Dr. mentioned several instances, which seemed to prove that it is not supported by mechanical laws, or by geological data. Mr. Morley followed with an interesting paper, showing that ocean currents were produced by the centrifugal motion of the earth, acting on water of different densities, causing a piling up at the equator, or an equatorial protuberance, of thirteen miles, and by gravity this is caused to flow down hill toward the poles.

Currents of air are not influenced by the same laws that govern the ocean currents. Difference in temperature in both cases produces motion, but in the former, the warm air is cooled by rising but a few miles, to effect the same purpose. At the equator, the air rises, and again falls at the latitude of 30° north or south: when warmed at this point, it again rises, to fall at 60°: from this parallel to the pole, is another circuit. Hence each hemisphere is divided into three sections.

DIFFUSION PROCESS FOR EXTRACTING SUGAR.

A revolution is confidently announced in the manufacture of sugar from the cane or root. The patented diffusion process of M. Robert, a large beet-sugar manufacturer in Austria, dispenses with nearly the whole expense of grinding, crushing and pressing, and claims to yield more and purer sugar. The cane or root is finely sliced by a machine cutter adapted with care to avoid crushing the cellular structure and thus liberating the albumen and other elements which usually mingle as impurities in the product. The material is then repeatedly soaked in water at a certain temperature, until the saccharine juice is approximately exhausted, or washed out: when the solid remainder, if root, is in wholesome condition for feeding to animals (as it is not when crushed) and if cane, needs only drying to make fuel. A "battery" of six or eight vats, is arranged in a circular series, connected by stop-cock pipes, and filled with the sliced material and water in due proportions. After standing a certain time, the liquid in the first vat is drawn off into the second, and replaced with pure water; after another interval, the second is emptied into the third and refilled again from the first; and so on, until from the last vat is withdrawn an infusion eight times enriched, and nearly equal to the juice of the plant. Pure water is put in its place, which goes thence to the first vat (by this time replenished with fresh material) and thus the circuit of operation is made continuous, each vat in turn discharging the concentrated juice and receiving pure water, and each in turn replenished, after eight infusions, with fresh material. At M. Robert's works in Selowitz, 200 tuns of beet-root are treated every twenty-four hours, by fifteen men, who could just as well manage twice or thrice the quantity.

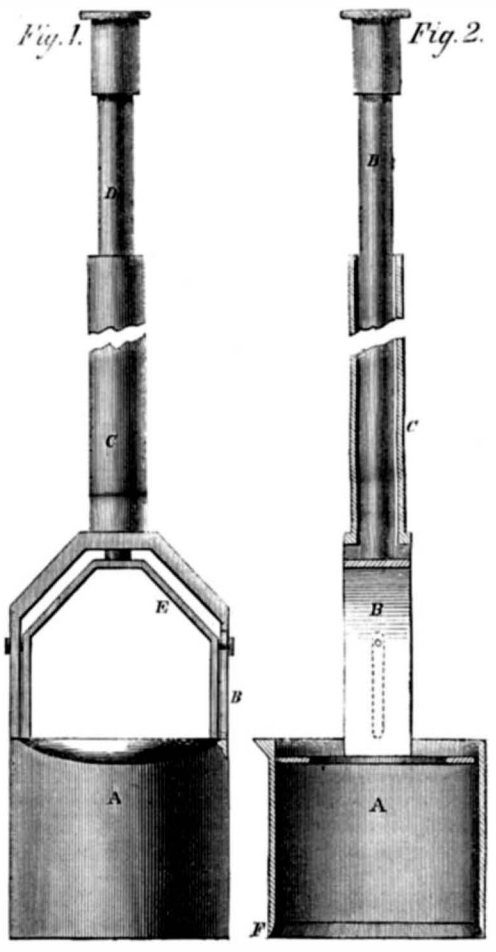
Silk Collodion.

The product of the silkworm has been reduced again by art, to the raw material or gum from which the insect spins its dainty fibres. A Frenchman, M. Persoz, fils, makes the discovery, using chloride of zinc as a solvent for the silk, and then separating the silk from the solvent by Prof. Graham's dialysis. This is a very simple process of filtration. A gutta-percha vessel with a parchment bottom receives the solution, (diluted with water to the consistency of collodion) and is set upon the surface of water. The chloride of zinc percolates through the moistened parchment bottom and mixes with the water; leaving the pure fiberless silk substance behind For photographic purposes, it is iodized by mixing with an aqueous solution of iodide, and then dried and sensitized. The chloride, before using, is heated with a small quantity of oxide of zinc, to neutralize any excess of acid, and then filtered through fine linen to remove the residuum of the oxide. For a prompt solution, the chloride is kept warm. The separatio to be entire, occupies a few days.

ELLERBE'S TRANSPLANTING IMPLEMENT.

Gardeners and other cultivators of the soil know the great advantage of starting many different plants in mass and then separating and transplanting to other situations; but however carefully performed, this work is always attended with considerable risk from the disturbance of the tender roots. The engraving shows an implement by which this necessary work can be accomplished without separating the intimate connection between the roots and the soil.

Fig. 1 shows the implement in perspective, and Fig. 2 in section. It is really a spade, circular instead of rectangular in form. The main part is a circular cylinder, A, of cast iron. The lower end should be of steel, sharp to penetrate the soil.



From two opposite sides of this cylinder, at the top, rise the arms, B, which are fastened to the hollow handle, C. Inside this hollow handle is a rod, D, terminating at the top in a knob, and at the bottom secured by the yoke, E, to a ring loosely fitting the interior of the cylinder. The upward and downward movement of this ring is guided and governed by pins sliding in vertical slots in the upright portion of the arms, B.

The operation can be comprehended by a brief statement, aided by reference to the engraving.

The implement is forced into the ground at the point where the transplanted shrub is to remain by means of a lateral projection on its upper rim, and a cylinder of earth is raised, which adheres to the iron cylinder by the compression attained by the inside bevel of the edge, as at F. A downward movement of the plunger clears the inside of the cylinder. The implement which cut the orifice in the soil, or a similar one, is placed over the plant to be removed and pressed into the earth. The plant with its surrounding soil is taken up and carried to its proper place, and, by means of the plunger and its ring piston, deposited, without disturbing it or the the soil in immediate contact with it. In fact, it transplants the soil as well as that which grows in it.

Patent secured through the Scientific American Patent Agency, Oct 16th, 1866, by W C. S. Ellerbe, of Camden, S C., whom address for particulars.

Musical Boxes---Where to Get Them.

Reader, did you ever own a musical box? If not, and you have money to spend in luxuries, we advise you to make an investment in one. A good musical box affords amusement to the adult as well as youth, and, with careful usage, will last a long time. For a holiday or birthday present, but few articles are more acceptable to most persons. The writer has been the owner of one, purchased of Mr. Paillard several years ago, and the entertainment it has afforded has more than repaid the cost, and the instrument is still as good as

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new. The degree of pleasure attained augments in mathematical ratio with the number of tunes the box plays.

M. J. Paillard & Co., 21 Maiden Lane, have given special attention to the importation of music boxes for the past seventeen years, and keep a great variety constantly on hand, which play from 2 to 72 tunes, and cost from a few dollars each to as many thousands. Music boxes are mostly made in Switzerland, and are an article of large exportation from the city of Geneva.

CONVERSION OF WOODEN SHIPS.

This subject is largely occupying the attention of our English cousins, the *Engineer* of Nov. 16th presenting an elaborate plan, illustrated by engravings for converting their "wooden walls" into iron-clads. This journal says: "We must not forget that this wooden fleet was, until the advent of iron clads, both in the number and character of its component ships, the most powerful fleet in the world. Its construction cost vast sums of money, and employed the talents of perhaps the most able constructors who ever existed in any country. Even at this moment, it is questionable if it be possible to set better ships afloat as regards strength, seaworthiness, and comfort. Much importance has been attached to recent changes in the construction of vessels of war, but, after all, these changes relate almost solely to what we may term the military equipment of the ships, either not operating at all, or else operating prejudicially as regards every question connected with the sailing, steaming, and turning qualities of the hull."

There is some force in the recommendation of the *Engineer* to utilize the present wooden navy of Great Britain, judging from the list given, of seven three-deckers and fifty-one two-deckers; but the question of the feasibility of the project turns wholly on the availability of these hulls for the purposes of modern warfare. Mr. C. F. Henwood submits a proposal to razee the three deckers to the lower deck, just above the water line, and then to armor the side with a skin of one-and-a-half-inch iron, covered with eighteen inches of teak carrying six eight-inch iron plates. The deck to be plated, and having above a raised spar or hurricane deck of iron, over the tops of the turrets, strengthened and supported by girders on the principle of our American steamboats. This deck to be enclosed by upright bulwarks of iron ordinarily, but when in action to be lowered and lie upon the decks. It is supposed by the *Engineer* that these girders, supported and strengthened by trussing, would restore the vertical stiffness lost by cutting down the ship's sides. Mr. Henwood proposes to convert the smaller vessels into monitors in a similar manner, except that where the large ships would carry six inches of armor the monitors would carry twelve inches. The cost of this conversion is calculated at less than half that of building new.

Engineering, on the contrary, ridicules the idea of converting what it calls "our matchwood fleet" into ships adapted to the purposes of modern warfare. It says: "Strength of structure is certainly a most important consideration in connection with our iron clad fleet, and does any one suppose that the wooden ships, even if they are still as good as new below the water line, will, when cut down and loaded with even so little as eight inches thickness of armor, be really strong ships, fit for any service—for ramming, and for all the rough work of modern warfare? They would have nothing like the lateral strength required; they have no compartments, and would very likely break open and sink on the first blow from an enemy's ram. The old timber ships cannot even bear the vibration of their own screws. What would they be, then, when half their lateral strength in the shape of decks was taken from them?"

John Bourne says: "Our old wooden ships, refurbished and plated, might do if we had no more enterprising enemy to apprehend than the Chinese; but it would be quite inexcusable, with our knowledge of what is being done and contemplated by other nations, to send our sailors into action in ships so weak and imperfect that no amount of courage or seamanship could possibly avert disaster and defeat."

It is undoubtedly the part of wisdom in the case of the English navy to begin *de novo*. It is folly to suppose that those wooden hulls when razeed and loaded with iron of sufficient protective thickness at and near the water line, and carrying immense turrets, could withstand the assaults of thoroughly built monitors. They were not constructed for such kind of warfare as must be waged on the seas hereafter. Of how much service would they be in such an encounter as that between the Austrian and Italian fleets at Lissa? Even the *Re d' Italia*, immensely stronger than any wooden ship could possibly be, could not stand the shock of ramming although almost impenetrable to shot. There is a vast difference between wooden ships built for plating and those built for the old style of naval warfare. These last are not fit even for harbor defence or floating batteries. Under the fire and direct assaults of true iron clads they would become the coffins of those who put their trust in them.

Patent Laws in Mexico.

Among the acts of the bogus Empire of Mexico, we hear of one which, it may be hoped, the legitimate government will soon find leisure to confirm or improve upon. We refer to the introduction of a system of patent laws; conferring rights for five, eight or twelve years, at the option of the inventor, with fees attached, respectively, of from five to twenty, twenty to forty, and forty to sixty, guineas. We might mention the features of the system in detail; but of course Maximilian's regulations are of small practical moment to any body at present, as no validity is very likely to be allowed to his acts by the future rulers of the country.

THE Russian iron clad fleet was begun in 1861 by the building of the *Pervenez*. Now the fleet consists of thirty armored ships of different descriptions.

PITEZELS EXCELSIOR CLAMPS.

The engraving furnished herewith will explain itself to harness makers, shoemakers, and other manufacturers of articles made of leather and other similar material.

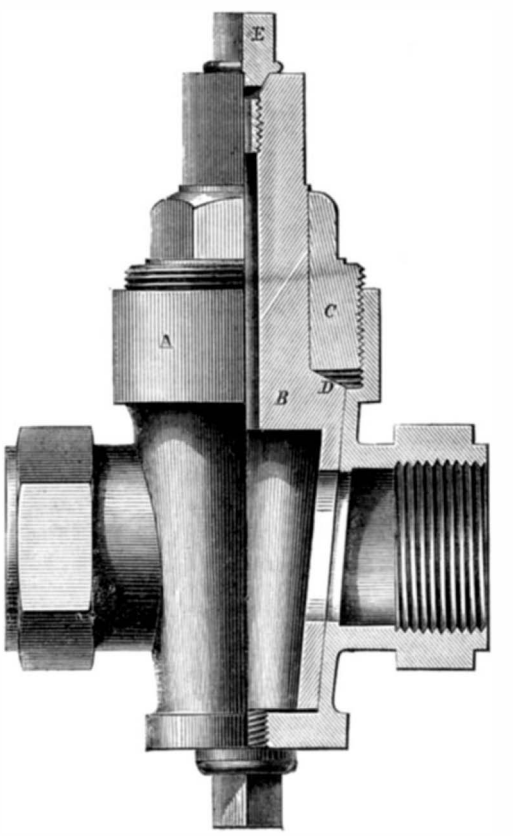
It can be attached to any bench, stool or table, and is strong, cheap, and efficient in operation. The fixed jaw, A, is secured to a bed of cast iron which has a flange extending up the back of the wooden jaw, and a rib which fits a mortise in the jaw, the two being secured in position by a screw bolt passing

through the iron and the wood. The movable jaw, B, is properly secured to the upper part of the lever, C, as seen in the engraving, which passes through the table and is pivoted at D. An extension of the bed plate clasps the table and is secured by a bolt. The lower end of this extension bears a small roller over which the strap, E, passes, one end attached to the lever, C, and the other to the treadle, F. The operation can now be readily understood. Depressing the treadle closes the jaws, and a rubber spring—not shown—between the jaws at the bottom, throws them apart when the pressure on the treadle is removed. The treadle can be held at any point by a simple ratchet rack on one of the ~~table legs to en~~ gage with a projecting plate of metal on the side of the treadle. The jaws are open from the table up, so that a dash board, the folded parts of a carriage cover, or long boot-legs, may be held. A diploma was awarded at the late State Fair of Michigan.

Patented Nov. 6th, 1866, by John H. Pitezel, Three Rivers, Mich., whom address for other particulars.

LEHMAN'S IMPROVED STOP COCK.

The improvements contemplated by the inventor of the cock herewith represented are of a nature which have often demanded the attention of engineers and others engaged in steam and gas work. The objects sought were a straight port or way, which is not secured in the ordinary globe valve; perfect joints without the possibility of leaking; freedom from danger under pressure, and security against freezing. These appear to have been attained in the cock shown in the engraving. It is shown half in perspective and half in vertical section.



The shell, A, is not open at the bottom as in ordinary stop cocks. The plug, B, is open at the bottom, and, as seen by the shaded portion in the engraving, is hollow nearly to the stem. The upper portion of the shell is enlarged to form a stuffing-box into which the follower, C, is screwed. The stem of the plug passes through this follower, and that part just above the seat, at D, is beveled toward the circumference. This beveled form, in combination with the flat bottom of the follower, compresses the packing at its outer circumference and thus prevents leaking. The follower also keeps the plug in its seat, and does this more securely and effectually than it is done by the screw and spring washer in the ordinary cock. Before the plug could be blown out by pressure, the threads of the follower and stuffing-box must be stripped.

The little screw, E, at the top of the plug stem, has a central longitudinal channel, communicating, just under the head, with a lateral opening. These openings communicate with the interior of the plug by a small central hole in the stem. Screwed into the bottom of the case, is another valve screw with similar openings. Both these screws have seats or are packed so that when closed they are tight, and when opened in the slightest degree they make a passage through the plug. It will be seen that by this simple device all freezing and bursting the case is obviated.

Letters patent for this invention were secured through the Scientific American Patent Agency, Oct. 16, 1866, by B. F. Lehman, Bethlehem, Pa., who will furnish all additional information to persons interested.

GOVERNMENT GAS LIGHTING.

The unpopularity of gas monopolies, and the difficulty of checkmating their doublings and combinations, are not confined to American cities. The town of Prague, in Bohemia, has suffered in the same manner as New York, until the municipal authorities have decided to abate the burden by taking the business into their own hands. Corporation gas works have been erected and pipes laid in the most perfect manner yet known, and gas of improved quality is furnished to the citizens at about $1 75 per 1,000 feet against $2 25 formerly charged. The private company is, of course, compelled to "follow suit," and can hardly manage to confederate with the opposition establishment, after the American fashion. Shall New York and Brooklyn look to Albany for gas, as well as for police, health, and the other necessaries of city life?

A proposal analogous to this is before the British Parliament, for turning over the business of supplying London with gas to the Metropolitan Board of Works. The city corporation is also in the field with a rival application for power. Both schemes propose the utter extinction of the private gas companies, and the purchase of their works, by agreement or compulsion, by the public authorities; a plan much less politic, fair, and practicable, than that of the Bohemian city, which establishes simply a permanent and unpurchaseable competition in the interest of the public, to keep down abuses and extortion.

Local authorities manage the gas-making in a number of towns in England, but probably not always with the most satisfactory effect for consumers; their prices in some cases being reported at a dollar or more per 1,000 feet, while Liverpool is supplied with an article of splendid illuminating power at 67 cents, and Plymouth with a poorer article, as low as 61 cents.

The competitive plan is evidently the only true economy; although the above comparison of prices, given by the London *Journal of Gas Lighting*, amounts to nothing of itself, the municipal prices quoted being only from small towns, where the cost is necessarily higher. A general return has just been made to Parliament under an act of the last session, from 157 chartered gas companies, and thirteen municipal boards; showing their rates, cost of coal, capital, and dividends. The experiment of public lighting on a large scale, like that of Liverpool or London, remains, it seems, to be tried in England.

Reservoir For Storing Petroleum.

The *Grocer*, (London,) says: -

A new method of storing inflammable oils has been invented and patented by M. Ckiandi and MM. Bizard and Labarre, of Marseilles. The reservoir is a bell-like vessel without bottom, fixed within a water vessel rather taller. At the upper part of the bell are two stop cocks—one for filling it, and the other for drawing off the oil. The surrounding cistern being filled with water to the hight of the bell, one of the cocks being turned to allow of the escape of the air, the bell also becomes filled with water. The oil is then pumped in, and being lighter than the water it remains at the top, and drives a quantity of water equal to its own volume out of the cistern by an escape pipe. The condition of the interior of the bell is shown by a tube and a float. To draw off the oil the discharge cock is opened, and more water being poured into the cistern, the oil is forced out of the bell. There is no danger from fire or leakage. At the bottom of the cistern is a small reservoir arranged to receive any impurities which may be deposited by the oil. The inventors assert the great storing economy of this system.

It will be seen that this plan does not materially differ from the apparatus used for storing illuminating gas being a modification of the common gas holder. If we are not mistaken, a method similar to this was in use in this city four or five years ago, and is still employed. It seems to be well adapted for the storing of inflammable oils, but not for protecting them during transportation.

A LINE of steam carriages for common roads is about to be established between Marseilles and Aubagne, a distance of ten miles. There are to be three departures daily, and the price of a return ticket will be 1f., 20c.

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BREECH-LOADING ARMS FOR THE GOVERNMENT.

In March last a Board of Examiners met by order of the War Department to examine and report upon the following :—

1. What form and caliber of breech-loading arm should be adopted as a model for future construction of muskets for infantry?

2. What form and caliber should be adopted as a model for future construction of carbines for cavalry?

3. What form of breech-loading arm should be adopted as a model for changes of muskets already constructed to breech-loading muskets?

The officers detailed for this duty were Major-Gen. W. S. Hancock, U. S. V.; Brevet Major-Gen. R. C. Buchanan, Col. 1st U. S. Inf.; Brevet Brig-Gen. P. V. Hagner, Lieut-Col. Ordnance Dept. U. S. A.; Brevet Brig-Gen. Charles Griffin, Capt. 5th U. S. Art.; Brevet Col. J. G. Benton, Maj. Ordnance Dept. U. S. A.; Brevet Col. Horace Porter, Lieut.-Col., Aide-de-Camp; Brevet Lieut.-Col. Wesley Owens, Capt. 5th U. S. Cavalry.

The following is their report :—

First: That the 45 inch caliber ball has given the best result as to accuracy, penetration and range.

Second: That all rifle muskets and single-loading carbines used in the military service should, if practicable, be fitted for the same cartridge.

Third: That the charge for muskets should be from 65 to 70 grains of powder, and from 480 to 500 grains of lead.

Fourth: That the Board recommends the plan of alteration submitted by H. Berdan. This gives the stable breech-pin, secures the piece against premature discharge, and involves only a slight change of our present pattern of arms. The bore of our present barrel (as has been proved by experiments before the board) can be reduced to the desired caliber by reaming out the grooves and inserting a tube.

Fifth: The Board has carefully examined the various patterns of new breech-loading arms presented to it, but finds itself unable to recommend any one of them for adoption for future construction by the Government. While fully impressed with the great mechanical ingenuity displayed in many of the plans, no one offers advantages for service superior to the altered musketre-commended; and therefore the Board considers that, in view of the large number of excellent muzzle-loading muskets now in store, and the slight changes of machinery necessary to make new arms on that plan, should more arms be deemed necessary, there can be no justification for an entire change of model, and the great expense consequent thereon, until some fur her improvement shall be devised producing more decided advantages than any of the arms yet presented.

Sixth: The Board is not decided in the opinion whether it would be best to have only magazine carbines in the cavalry service. From past experience the Board would be unwilling to dispense entirely with magazine arms, and as these arms can be used ordinarily as single-loaders (retaining a number of charges in the magazine for extraordinary occasions, free from danger of ignition in the ordinary use of the gun), the only objections to their exclusive use are the additional expense of this arm over the simple single-loader, and the greater inconvenience of the use of a lever-gun compared with some patterns of the hinge-breech gun which have been presented to the Board.

In consideration of the above, and also of the manifest advantages of having single-loading carbines (if needed) and muskets made upon the same pattern, except in length of barrel, the Board recommends that until a suitable plan for new muskets can be obtained, offering decided advantages over the proposed plan now recommended for altered muskets, no single-loading carbine should be constructed for the army.

The experience of the late war, as well as all experiments by this Board, prove that the Spencer magazine carbine is the best service gun of this kind yet offered. Our experiments detected a defect in the arrangement for the extractor, which has been corrected by the manufacturers, upon the suggestion of the Board, producing, in the opinion of the manufacturers themselves, a decided improvement in the arm, and one that will lessen much the liability to become disabled in the service. It is believed, however, from models and from experiments of the Board, that the magazine arm is capable of further improvement; and the Board would therefore recommend some delay in adopting definitely a pattern "for future construction of carbines for cavalry service." Should new carbines be previously needed, it is recommended that the Spencer carbine, with the modified extractor, be used.

Seventh: The Board is of opinion that for facility of handling, lightness, and accuracy of fire, it will be of advantage to reduce the length of barrel, when practicable, to not less than 33 inches, retaining the present length of bayonet; and also, that with the adoption of the metallic cartridge, the present cartridge box should be modified.

Recommendation 4th may be subject to question. We have very little faith in barrels that are reamed out to admit an interior tube. The object of this recommendation appears to be to adapt the present Springfield musket of 50-100ths caliber to a caliber of 45-100ths. The inner tube must in this case be exceedingly thin, while the barrel proper would be reduced in thickness and strength. Gen. Grant is right in endorsing on the report that "the superiority of the .45 caliber in accuracy, range, and penetration, seems to have been placed beyond a doubt, but a uniformity of caliber being so desirable, and there being such a large number of arms of calibers .50 on hand, it may be advisable to adopt this caliber."

We are not aware of the details of Mr. Berdan's plan of conversion, but have no doubt that our present rifled muskets could be converted into efficient breech-loaders more cheaply and easily than new ones could be manufactured.

Iron for Heavy Forgings.

The Detroit *Post*, in an article referring to some remarks in the SCIENTIFIC AMERICAN, relative to the composition and forging of heavy shafts and cranks for steamers, calls attention to the excellent quality of Lake Superior iron for this purpose, and mentions some remarkable tests which tend to show its homogeneousness and tenacity. We were always favorably impressed with the excellent qualities of this iron, from repeated examinations and the result of several experiments, but we were not aware that it posessed the qualities of tenacity, ductility, and uniform density, to so high a degree as is stated by the *Post*. This journal says :—

We believe it to be the most tenacious, uniform, durable and reliable variety of iron, for heavy forgings of the kind under discussion, readily procurable in American markets, if not the best for the purpose to be found in the world. Its tenacity and even quality are wonderful; and it is almost impossible to conceive of a steamer shaft made of Lake Superior iron breaking. It might be bent—if well forged, even at right angles, were a sufficient force applied—but it would stubbornly refuse to break. We have seen with our own eyes an inch square bar of Lake Superior iron bent double and hammered down at the bend, when perfectly cold, without even presenting a fibrous or abraded appearance, but drawing perfectly smooth and as bright as polished tin over the curve. We have also seen an inch-and-a-half round bar, having a solid head forged on each end, drawn out by tractile force like a stick of soft wax, until it was about one inch in diameter in the center, without a sign of parting, or the tearing of any fibers, or the appearance known as "brooming;" but the portion drawn out remained smooth and became as bright as a mirror. Such tenacity and uniform density are exceedingly rare in even the best brands of iron, but are among the universally known qualities of Lake Superior iron when properly forged.

Krupp's Guns.

On page 388 of our last volume we copied an article from *Engineering*, which stated that Krupp's steel guns had "burst on trial." Krupp's American agent denounces the article as "disreputable" and expresses surprise that we should have given place in the SCIENTIFIC AMERICAN to such malicious reports. He says in his letter to us "as to their having burst on 'trial' when 'fired to destruction,' as the phrase is, that is a matter of course; but none ever burst in service." *Engineering* does not say that any of the guns burst in service, but simply on trial, which might or might not refer to experimental trials. Our authority is usually correct in its published statements, and we do not see any cause for surprise that we should have copied the paragraph. If there is anything disreputable about it, it attaches to *Engineering* and not to the SCIENTIFIC AMERICAN.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

TERRASPHERE.—ELEAZAR ROOT, Indianapolis, Ind.—This invention is designed to exhibit correctly to the eye the true motion of the earth, by means of an artificial globe revolving in a vertical circle, corresponding with the plane of the Ecliptic, around a fixed center representing the Sun. It also exhibits the diurnal revolution of the earth, on its own axis, with its satellite, the moon, connected and revolving around it. By these means are shown plainly the physical causes of all those phenomena of nature consequent upon the successive and constantly recurring changes in the relative position of the Sun, the Earth and the Moon.

DOUGH MIXER AND KNEADER.—S. J. TALBOTT, Milford, N. H.—This invention consists of a tapering can, having a double metallic cover, and which is pivoted in a frame by a hoop provided with trunnions and with a handle by means of which it is operated.

SWEDGE FOR WELDING AND SHARPENING HORSESHOE TOE CALKS.—PETER BADORE, Montpelier.—This invention has for its object to furnish swedges by the use of which the steel may be drawn to an edge quickly and uniformly for forming toe calks for horseshoes; and by means of which the calks may be sharpened and by the same operation quickly and securely welded to the shoe.

SAWMILL.—E. H. STEARNS, Erie, Pa.—This invention relates to several novel devices and arrangements of machinery for the purpose of simplifying and reducing the cost of construction, and operating the mill easily, saving both time and material, and performing the work better.

WEEDING HOE.—MITCHELL PENZ, Naugatuck, Conn.—This invention has for its object to furnish an improved weeding hoe so constructed that it may be contracted or expanded as desired, so that it may be adjusted for use when the plants are at different distances apart.

IRON MANUFACTURE.—James Henderson, Brooklyn, N Y.—In converting cast iron into Besseme-steel, the triple compound of iron, carbon and manganese, is with great difficulty forced into the mass of metal previously treated by the pneumatic process: for the converted metal has a specific gravity, greater than the compound. Mr. Henderson has obviated this difficulty, by charging the blast furnace with a mixture of iron and manganese ores, or indeed, any of the manganiferous iron ores, such as the red oxide of zinc, and Franklinite, so that there is formed on the hearth of the furnace a molten mass of metal, alloyed with metallic manganese in such quantities that it may be run directly into a Bessemer converter and subjected to the usual process of decarbonization, with this advantage over the ordinary method, that the indispensable manganese is thoroughly incorporated, and exerts its beneficial influence from the very beginning, instead of being introduced near the end of the pneumatic process. By this mode, it is claimed that Bessemer steel can be furnished much cheaper than by the older method, and finished Bars, Rails, Plates, etc. can be produced by the same heat that melts the ores into crude or cast iron. The plan, now in successful operation in Austria, is soon to be largely introduced into this country.

FRUIT GATHERER.—H. L. Scott, Flessis, N.Y.—This device consists of a basket attached to a long rod, and provided with a pair of shears which extend in an inclined position over the mouth of the basket. The shears are operated by a cord, and when the stems are severed thereby, the fruit drops into the basket, it being thus gathered from any hight without being bruised by falling to the round.

CROSS-CUT SAWING MACHINE.—Edwin Hard, Canal Dover, Ohio.—This invention has for its object to furnish a cross-cut sawing machine, so improved in construction that its operation may be more effective, convenient, and satisfactory.

RIVETING OF TRUNKS.—Walter D. Burnett, Newark, N. J.—This invention relates to a device for facilitating the riveting of bars or plates to the exterior of trunks, boxes, and other articles, and it consists in having a block covered with metal on which the trunk or box may be fitted, the block being applied and arranged in such a manner that it may, with the greatest facility, be rotated, and the bars or plates riveted to the different sides of the trunk or box.

GOVERNOR.—A. A. Henderson, Norfolk, Va.—This invention relates to a method of governing or controlling the speed of marine and other steam engines by eccentrics and cams upon revolving shafts driven by the engine, and arranged in such a manner that any variation in the speed causes them to open or close the throttle valve, thus letting on or shutting off the steam.

TOOL FOR CLEANING BOILER TUBES.—S. Van Auken, Binghamton, N. Y.—This invention consists in a tool composed of three or more spring arms made of elastic sheet metal, and twisted so that the same will yield both ways; the outer ends of said spring arms are formed into segmental scrapers, and they are provided with cams on the inside and outside of said scrapers, whereby the operation of introducing the tool in a tube or removing it therefrom is materially facilitated.

FINISHING LASTS.—Matthias Speule, Detroit, Mich.—This invention relates to a machine which is intended to finish the toes and heels of lasts, as the same are received from the last-turning machine. It consists of a vibrating head containing two adjustable clamps which are connected together, and one of which is intended to receive the pattern last, while the other receives the last to be finished. This head stands opposite to a double-spindle stock, one part of which carries the guide-wheel, and the other the cutter wheel. As the pattern last is pressed up against the guide wheel, the cutters act on the last to be finished, and the toes and heel of this last are worked down in exact conformity with the pattern last.

LIFE RAFT.—James Murtaugh, New York City.—This invention relates to a life raft composed of two or more hollow expansible rings, one inside the other, and fastened together by cords, ropes, or other suitable means, in such a manner that a raft is obtained, which, when not inflated, can be stored away in a small compass, and which, when inflated, affords room for two or more persons, and is sufficiently buoyant to carry said persons, and enable them to sustain themselves above water even in a rough sea.

SLEIGH BELLS.—Abner G. Bevin, Chatham, Conn.—The object of this invention is to construct the rivet by which the bell is secured to the leather, so that the same will at once effectively hold the bell to the leather, and also prevent the bell from turning; and to so construct the whole that it will be cheap and simple and easily made.

RAG ENGINE.—James M. Shew, Baltimore Co., Md.—This invention relates to an improvement on rag engines, for the manufacture of paper, and consists in attaching to each end of the cutting cylinder a rotated flange or spiral scroll, for the purpose of preventing the rags from working in around the spindle, and choking the cylinder, thus materially increasing friction and wasting power, as is the case with the ordinary rag engine.

CLOTHESPIN.—T. L. Goble, Bradford, N. Y.—This clothespin consists of two jaws hinged together at one end so as to open from and close upon each other in combination with a loose sleeve or collar, so arranged upon the said jaws that by properly sliding it it will close or open the jaws, as the case may be.

SAWING MACHINE.—T. H. Cushing, Dover, N. Y.—This invention relates to a machine for sawing timber in curved forms, such as is used for ships, bridges, etc., etc. The invention consists of two or more reciprocating saws, rotary planers, and a bed or carriage which moves in the arc of a circle.

COTTON CULTIVATOR.—A. K. and B. H. Foster, Hallettsville, Texas.—This invention relates to a cultivator, designed more especially for cultivating cotton, scraping the earth away from the young plants and thinning out the same. It consists of a shave or scraper composed of two parts and a reciprocating cutter operated from the driving wheel or the wheel which supports the implement.

HYDRAULIC GOVERNOR.—S. M. Hunter.—This invention relates to a method of regulating the quantity of water discharged upon a water wheel, or of steam for driving a steam engine, by the action of an engine operated by water, which engine shall be controlled by a common centrifugal governor, thereby causing an even and uniform speed in the machinery propelled.

STEAM VALVE.—James L. Mackey, Seymour, Ind.—This invention relates to a balanceconical valve which is applicable to a single or double cylinder engine and which is composed of a hollow movable flag working in a sleeve which is fitted into a suitable shell that is cast solid with or otherwise rigidly attached to the steam cylinder; the play valve, the sleeve and the shell being provided with suitable steam and exhaust ports in such a manner that by giving to the play valve an oscillating motion, the steam is alternately admitted to either end of the cylinder and the desired reciprocating motion is imparted to the piston.

CLOTHES-WASHING MACHINE.—James Ballard, Almont, Mich.—This invention relates to a clothes-washing machine of that class in which a reciprocating corrugated rubber is used. The object is to obtain a simple clothes-washing machine which may be operated with facility and a moderate expenditure of power and which will admit of the rubber conforming or yielding to the clothes in the sudsbox however uneven or irregularly they may lie or be moved in the latter under the movement of the rubber. The invention has further for its object the arranging of the rubber in such a manner that it will perform the double function of a rubber and presser so that the clothes will be acted upon in a very efficient manner.

GATE AND DOOR CATCH.—B. D. Shaw, Beverly, Mass.—This invention consists in a catch for application to gates and doors having two pivoted catches which are operated upon by a rocking lever, which catches will automatically secure the gate when closed, and which can be operated alternately, accordingly as to whether the gate is to open toward or from the operator, for releasing the catches from a nose or pin secured to the gate post.

SELF-OILING DEVICE.—Thomas S. Brown, Poughkeepsie, N. Y.—The object of this invention is to obtain a self-oiling device for crank pins and other journals of machinery which have either a rotary or reciprocating motion, to keep the oil in the fountain in a sufficient state of agitation to cause the same to be fed to the journal in requisite quantity to ensure perfect lubrication.

TIRE-TIGHTENING DEVICE.—T. B. Mase, Milwaukie, Wis.—The object of this invention is to obtain a simple means whereby tires may be tightened on wheels, at any time when they become loose, without the aid of a smith or mechanic, and by an extremely simple and efficient arrangement of parts.

SEPARATING COCKLE FROM WHEAT.—Samuel Heflebower, Alexandria, Va. and John Milton Reed, Loudon county, Va.—The grain is passed between a pressure roller and one or more rollers surfaced with a substance to which the cockle alone will adhere; the cockle is brushed from the rollers at a succeedingpart of their revolution so as to prepare them for duty.

TRELLIS FOR GRAPE VINES, ETC.—B. F. Elliott, Cedar Rapids, Iowa.—This invention relates more particularly to improvements in a trellis or rack for grape and other vines, patented on the 24th of July.

SAW SET.—John Clarridge, Pancoastburgh, Ohio.—This invention has for its object to furnish an improved saw set so constructed and arranged as to set a saw quickly and accurately, and which may be adjusted to set the teeth of fine or coarse saws with equal facility and accuracy, and to set them much or little as may be desired.

KNOB EYELET FOR FASTENING CARRIAGE CURTAINS.—Charles W. Acker, Watertown, N. Y.—This invention has for its object to furnish an improved eyelet for attaching carriage curtains to the knobs conveniently, easily, and quickly.

COMBINED ROLLER AND HARROW.—Geo. H. Woodruff, Jerseyville, Ill.—This invention consists in combining two or more sections of field rollers with a harrow in such a manner that the roller may be removed and the harrow used, or separately employed from the harrow, so that the ground may be rolled and harrowed at the same time, or only harrowed, as may be desired and as the nature of the work shall require.

SPRINKLING ATTACHMENT TO BROOMS.—Peter Louis, New York City.—This invention consists in the arrangement of a crescent-shaped cup provided with a socket to fit a broomstick and furnished with a vent valve in its upper and with a large number of small holes in its lower surface, in such a manner that by slipping said cup over a broom stick on the butt end of a broom and filling it with water, the water will gradually trickle down over or through the broom and a self-sprinkling broom is obtained which obviates he necessity of sprinkling previous to commencing the operation of sweeping.

POTATO DIGGER.—Charles B. Cannon, Keokuk, Iowa.—This invention has for its object to furnish a machine by means of which potatoes may be dug, separated from the dirt, and sorted, the larger and smaller ones being deposited in separate compartments in a wagon or cart body.

METAL LOOPS FOR TAGS.—Samuel B. Fay, Franklin, Pa.—The nature of this invention consists in the construction of metal loops or locks for attaching tags or labels to articles of merchandize, formed so as to pass through or over available parts of the articles to be marked.

SAWING MACHINE.—Washington H. Stewart, Logansport, Ind.—The nature of this invention consists in the peculiar and novel arrangement of a saw frame in combination with the saw shaft and by which the saw is made to run level and in line with the driving shaft and pitman so as to adjust and accommodate itself to different-sized logs.

BROOM.—Willard P. Brooks, Fairmount, Minn.—This invention consists in the peculiar construction of the socket and in the arrangements for holding the brush and handle.

SUGAR-CANE PLANTER.—J. Eusebio Cortes, Sagua la Grande, Isle de Cuba.—This invention relates to an improvement in a sugar-cane planter by which sugar cane can be planted even and accurate and at the same time covered and the ground leveled by the same machine.

ELLIPSOGRAPH.—Honestus M. Albee, Webster, Mass.—This invention consists in the arrangement of an arm provided with an adjustable point in combination with one leg of an ordinary compass, the other leg of which is constructed to receive a pencil or pen in such a manner that when the adjustable point is removed from the leg of the compass to a distance equal to the difference of the major and minor axis of the ellipse to be described and said point and leg are moved along on the two cathetí of a right-angled triangle or in the grooves of a trammel, the pen or pencil connected to the compass will describe a portion of an ellipse and by shifting the right-angled triangle and repeating the operation a complete ellipse of any desired proportion can be described.

HIDE WORKER.—Henry Lampert, Nunda, N. Y.—This invention consists in the arrangement of a round or convex movable beam either in the shape of a round cylinder or in parts of a cylinder of any convenient shape or size for the hides in combination with eccentrics or other suitable mechanism applied to the beam in such a manner that by the action of said eccentrics or other mechanism the beam can be raised or lowered without interfering with its rotary motion and those parts of the hide which have to be worked under the knife can be easily exposed to the action of the worker. It consists further in a worker composed of a stone or wooden scraper and a knife which are adjustable in a head in combination with a spring, crosshead, and pitman, connecting said crosshead with the eccentric wrist pin of a crank or disk in such a manner that by imparting to said disk or crank a revolving motion, the worker receives a reciprocating and a rising and falling motion causing it to act on the hide with the proper force and at the proper time. It consists, finally, in making the working block adjustable by means of a screw rod in such a manner that the scraper and the knife can be made to bear on the hide with any desired force.

WATER AND FIRE-PROOF PAPER.—Thomas Irving, John McNeil, Geo. W. Rich, and Cyrus J. Fay, Elwood, N. J.—This invention relates to an improvement in the manufacture of that class of paper which is used for the covering of sides and roofs of buildings or for other purposes of a similar natnre.

STEAM BOILERS.—Robert Bailey, Idaho City, Idaho Ter.—This invention relates to improvements in a steam boiler, and consists in constructing it in sections in such manner that it may be readily opened and taken apart for repairing or cleaning the fire flues and spaces in the different sectional parts, which fire flues and spaces are so divided and arranged as to present an immense amount of fire surface in proportion to the size and weight of the boiler, compared with ordinary boilers.

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ADJUSTABLE MITER.—Peter A. Snyder, Jersey City, N. J.—The object of is invention is to construct a miter, which may be readily adjusted to any angle, and one which will correctly divide each angle into two equal parts, so that the moldings may be marked by it ready for cutting.

STEAM TRAP.—Thomas N. Davey, Jeffersonville, Ind.—The object of this invention is to automatically relieve steam cylinders, steam pipes, and all her apparatus where steam is used from condensed steam or water of consation; also to give the engineer or operator a full and easy control of the rap valve under all circumstances whether under the pressure of steam r not.

SASH FASTENING.—Benj. S. Hyers, Pekin, Ill.—The nature of this invention onsists in the peculiar construction of a friction wheel which is made to ear upon the side of a sash so as to hold it in any desired position.

HAME FASTENING.—W. J. Alexander, Manchester, Iowa.—This device is for fastening the hames upon the collar, and consists of two portions attached to the respective hames, one slipping into the other and fastening therein by the ngagement of a spring catch with recesses in the socket. The catch piece is detached from the socket by a peculiar motion, and the whole is metallic and intended to prevent the fastening from being gnawed and destroyed as is fr equently the case with mule harness.

SAW MILL.—E. H. Stearns, Erie, Pa.—This invention consists in several novel devices and arrangements of machinery by which the construction of ircular saw mills is much simplified and the operation rendered more effective; and the improvements refer especially to the feeding and gigging apparatus which are made to work with great facility and exactness.

SHEEP RACK.—Byron D. Tabor, Wilson, N. Y.—This invention consists in an improved sheep rack, for the purpose of furnishing a simple and efficient feed rack, and one easily set up, and taken down for transportation or storage.

TACKLE BLOCK.—John Briggs, Louisville, Ky.—This invention consists in a novel construction of the shell of the block and in an improvement on the p in of the sheave and hook, whereby a very cheap and durable tackle block is obtained.

SAFETY CLIP.—J. Irving, New York City.—This invention consists in the arrangement of a safety clip in combination with the fifth wheel of a carriage or vehicle in such a manner that by said clip the strength of the connection is increased, and the fifth wheel is prevented from rattling.

MALT EXTRACT.—Leopold Hoff, New York City.—This invention relates to a new beverage which is derived from an extract of barley malt produced by a peculiar process and mixed with certain hygienic ingredients, whereby a compound is obtained which on account of its invigorating and heating qualities, particularly in cases of general debility and consumptive attacks may properly be termed beer of health.

REVERBERATORY FURNACE.—J. M. Whiteside, San Francisco, Cal.—This invention consists in the arrangement of a revolving stirrer to which motion is imparted by mechanical power in combination with the hearth of a reverberatory, in such a manner that the operation of stirring and moving a mass of pulverized ores while roasting or chloridizing in the reverberatory furnace is materially facilitated. The furnace in which the ore is roasted, is covered up and arranged so that all but superheated air is excluded therefrom while the same is in operation, and furthermore jets of superheated steam are injected over the ore on the hearth to facilitate the disintegration and chloridization of the same.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

R., N. Y. asks if there is any material, whether metal or fluid, which is expanded or contracted by the daily changes of light and darkness.

W. L., of Wis.—For reply to your question on the pressure on slide valves we refer you to "Watson's Modern Practice" published by H. C. Baird, 406 Walnut street, Philadelphia. The reply would occupy too much room in our columns, and we have published it several times.

F. S. B., of N. Y.—To make a lacquer for tin to resemble brass, make a varnish by dissolving shellac in alcohol and color it with turmeric to suit your eye. Make the tin clean and apply with a brush.

S. C. D., of Tenn.—The knives of a wood-planing machine can be ground true and regular on an even grindstone, by resting the backs against a cleat secured across the frame at a proper distance from the stone to form the right bevel. Machines are, however, built at a small cost which do the work automatically better than it can be done by hand.

J. W. M., of N. Y., asks if a man could jump from the platform of one locomotive to that of another, the two engines running on parallel tracks, eight feet apart, at the equal rate of sixty miles per hour. We reply: Relative to each other and the man jumping the engines are at rest. Except for the current of wind, sixty miles per hour, a man could jump across with no more effort than from point to point at rest.

W. H. S., of Ill.—We do not think that either the caloric or the gas engine, as manufactured, is adapted to propel carriages over rails or on common roads. The manufacturers of these machines will give you the facts.

H. R., of N. Y.—The benefits or disadvantages of jacketing engine cylinders with steam is still a disputed question. Hopkinson says that where the steam is admitted from the boiler to the jacket, thence to the cylinder proper, an increased amount of cooling surface is exposed, lowering the force of the active steam and occasioning loss. He prefers lagging the cylinder with felt and wood. Bourne, on the contrary, believes there is a saving of steam and fuel by this style of steam jacketing. Our own opinion is that to really effect a saving by a steam jacket, the jacket should be connected with the boiler by an independent pipe and the steam thus used not admitted to the working cylinder. The steam in the outer case would then be higher than that in the cylinder, as it would not lose, as that in the cylinder, by expansion. In this case, the jacket must be strong enough to sustain the full boiler pressure. Jacketing with the exhaust steam we believe to be the sheerest folly.

C. A. G., of N. Y.—If you are successful in completing an engine without any exhaust, as you propose, it is not probable any patent will interfere with you. But what will you do with your steam when you have used it? Condense it and you have a low pressure engine.

M., of Pa.—Our reply to the question of the relative power of engines with different lengths of stroke, or crank, was correct. The *power* exerted is the same in either case. *Power* in this connection being made up of force or pressure exerted, time occupied and steam expended. Only the first condition, or element, seems to have entered into your calculations. In that reply, you will see that we said, "the reason for using different lengths of stroke for cylinders of a common diameter is adaptability to the kind of work to be performed." It may be that your locomotive engineers believe that less power is exerted in starting a train with an engine having long cranks than with one having short cranks. This is apparently, but not really, true. It requires more steam and more time to push a piston three feet than it does to push one eighteen inches, the diameter of cylinders being equal. You cannot get velocity, i. e. expend time, without expending force. Test it on your grindstone with weights.

D. A., of Pa.—One of the minerals you send is a good sample of umber; it is worth a chemical examination. The other specimens are indicative of a coal region; one of them resembles plumbago but is a species of coal.

H. A. S., of Me.—Petrifying wood for razor hones is a new art to us. Silicious matter may be introduced into the body of wood by soaking it first in a weak solution of soluble glass, and then in an acid.

E. F. M., of Ct.—France is the only country that requires a patented invention to be manufactured within its dominions under forfeiture of the right.

J. F. M., of——.—You have no right to retain the patterns delivered to you by parties who employed you to make castings for them.

D. F. A., of Pa.—The composition of the Zopissa cement has not been made public, and we are not aware that any samples of the article have been brought to the United States. As soon as we procure further information on the subject we shall hasten to give it to the public.

H. O. P., of Mass., desires us to publish "the best methods of finding and recognizing the standard qualities of whale, lard and coal oils." It is not convenient for us just now to prepare a suitable article on the subject. Perhaps some of our readers will furnish the information.

C. A. B., of——.—To magnetize a steel bar by means of an electro-magnet:—bring one of the poles of the electro-magnet on the center of the bar, and then pressing the two in contact, slide the electro-magnet to one extremity of the bar; perform the same manipulation with the other pole of the electro-magnet on the other half of the bar. The process is to be repeated until the bar becomes fully saturated. The most powerful magnets are obtained by combining thin bars which have previously been magnetized. Magnets should be made of high steel of the best quality, and highly tempered.

SUNDRY ANSWERS.—B. N.—Study our book for Inventors and Mechanics, 25 cts., to know how to calculate horse-power of an engine.—Young Mechanic is informed that minors can obtain patents. See same book.—J. H.—You need not sig new papers.—F. H. M.—You will find a method for attaching rubber o leather in back numbers SCIENTIFIC AMERICAN.—E. S. C.—As to vinegar manufacture, write to H. C. Baird, Philadelphia, Pa., for book. C. P.—ditto. We do not know the parties.—G. H. U.—Rubber can be made snow white. There is a patent for the process. The Goodyear patent for the idea of vulcanizing rubber has expired.—H. B.—No person can use a patented article without the consent of the patentee. It is not new to cement the ends of slates for the purpose you propose. It is doubtful whether the use of the slats would entitle you to a patent. But you can try.—A. P. P. will probably find that the patented jack is slightly different from the one in use. The patent doubtless rests upon the difference.—F. S. C.—Your strap arrangement for coaches can probably be patented.—J. H.—Consult Bourne's book on the steam engine for rule as to lever for safety valve.—D. H. H.—There are ice machines in operation at New Orleans, we believe.—E. G. B.—The "Northern Lights" are supposed to be due to electrical currents.—G. L.—We are not acquainted with the merits of the tanning extract to which you allude nor the company.—D. H. H.—You and your friend will find the nature of the late showering meteors described in recent numbers of SCIENTIFIC AMERICAN.—A. T. The merits of both engines have been discussed in our paper.—J. H. D.—We do not know of any work on boat building.—G. Nearly all the best barrel machines have the toothed cylinder.—W. A. M.—Steam wagons can be successfully used on good roads.—J. A. E.—For best saws and engines see advertisements.—M. B. wants somebody to tell him how to make rings from gold dollars. He has been making one by punching the dollar and hammering the exterior; but he says this leaves a rough hard crease in the middle, and how to soften it he does not know.—J. K. D.—The joint owners of a patent are not partners, and each has the right to make, use, and sell, without accounting to the other.—J. K.—Rebs are now only required to swear that they are citizens of the United States. The oath is the same that all persons are required to take on applying for a patent. To swear that you are a citizen of the Confederate States wont do. The holder of the assignment enjoys the rights of the patentee.

Business and Personal

The charge for insertion under this head is 50 cents a line.

S. Kalfus, 170 Bleecker, N. Y., has for sale ($60), SCIENTIFIC AMERICAN from 1848 up.

J. B. Wilbur, of Johnstown, Pa., desires to know how to remove the scale from new rolled wrought iron. Acid does not answer.

Geo. Francis, Box. No. 4658, New York City, wishes to know where machinery for plaiting or folding shirt bosoms can be purchased.

Jos. C. Haines Lancaster, Pa., wishes to correspond with an author capable of writing on the following subject, "The necessity of every person to be able to hold his horse."

Makers of Ross' Patent Portable Flouring Mill, please address American Tablet Co., Boston, Mass.

J. T. Middleton, New London, Conn., box [illegible] wishes to purchase a first class treadmill horse-power machine.

The best hay-packing and baling press, for field use, is asked for, with prices, by R. Tattershall, Beloit, Wis.

Parkestein.—H. W. Ladd, Philadelphia, asks where it is manufactured.

Small printing press suitable for druggists, with type, etc. wanted by H. Kroon & Son, North Bennington, Vt.

A. Krauss, Tarr Farm, Pa., wants to know where he can get one of them whistles that sounds like the squeak of a pig, warbles like a canary bird, etc.

A. Tavarts, Kingston, Jamaica, W. I., desires to obtain a machine for making paper boxes for matches (to hold 50 matches). Also wishes for improved machinery for matches, and a small, economical, easily-managed steam engine.

G. Wolf Holste, Neshannock Falls, Pa., wishes to know whether Dale's Patent Loom will weave fancy goods. Also whether the motion is simple and substantial.

Information is wanted concerning the best kinds of work suited for execution by convicts in a penitentiary, where coal, wood, iron, leather, etc., are abundant. Also wanted one or more foremen fully competent to direct such labor. Communicate with H. J. Phares, Selma, Ala.

Jno. Selick, Lewistown, Pa., wishes the address of parties who will manufacture an improved cast-iron apple parer, corer and quarterer.

Horse Hay-Fork Pullies, D. M. Garrett, Shelly, Ohio.

Henry Johnston, Gloucester, Mass., desires to know how to make a cement that will stand a sudden heat and that will set as hard as stone. Wants it for molds, to be repeatedly used.

J. M. Goff, Ionia, Ill., desires information where he can obtain flat, untempered, steel wire, three-eighths inch wide, one-sixteenth thick, price per 100 lbs.

Any one having on hand or who will make rivet machines of approved patterns can find a cash purchaser, by addressing with description, price, etc. "Rivets" P. O., Buffalo, N. Y.

N. Spencer Thomas, of Painted Post, N. Y. writes—"We now have a club for SCIENTIFIC AMERICAN in this village, already numbering eleven or twelve against two heretofore sent to this P. O." Similarly encouraging letters are pouring in from all directions.

E. C. R. of Va., writes wishing the cost of an engraving of a new invention he has just patented, and adds, "I proposed taking my patent out through your office, but was advised to make my application direct to the Patent Office. How much trouble I have had, you may well know. I assure you I am heartily sick of *direct* applications, and shall in future do my business through your house." Mr. R.'s experience is the same as that of nearly all others who attempt to obtain patents on home-made papers, as our large business in re-preparing papers and prosecuting cases which have been refused by the Patent Office, bears testimony.

☞ Manufacturers of improved machinery of every kind, Steam, Mining, Agricultural, Wood Working, Manufacturing, will find it a great advantage to keep a short permanent advertisement in the SCIENTIFIC AMERICAN. This paper circulates extensively in all of the States, and doubtless is more thoroughly read by mechanical people than any other publication. Advertisements published in the SCIENTIFIC AMERICAN, costing only a small sum, have been known, in many instances, to bring back orders amounting to thousands of dollars.

EXTENSION NOTICES.

William Coleman and Stephen G. Coleman, of Providence, R. I., having petitioned for the extension of a patent granted to them the 15th day of March, 1853, for an improvement in supporting the topping-lift and peak-halyard block of sail vessels, for seven years from the expiration of said patent, which takes place on the 15th day of March, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day of February next.

Robert Waddell, of Liverpool, Kingdom of Great Britain, having petitioned for the extension of a patent granted to him the 6th day of June, 1854, antedated to April 27th, 1853, and dated in England, the 2nd of March, 1853, for an improvement in balancing slide valves of steam engines, for seven years from the expiration of said patent, which takes place on the 27th day of April, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of February next.

James E. A. Gibbs, of "Steel's Tavern," Virginia, having petitioned for the extension of a patent granted to him the 21st day of February, 1860, for an improvement in design for a sewing machine, for seven years from the expiration of said patent, which takes place on the 21st day of February, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of February next.

Moses Marshall, of Lowell, Mass., having petitioned for the extension of a patent granted to him the 15th day of March, 1853, for an improvement in knitting machines, for seven years from the expiration of said patent, which take place on the 15th day of March, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day of February next.

IMPORTANT LAW CASE---FIRE-PROOF SAFES.

WM. A. SANBORN vs. SILAS C. HERRING, ET. AL.

N. Y. Supreme Court—Before Judge Barnard and a Jury.

The facts in this case are briefly as follows.

The plaintiff in 1862, was an express and collecting agent and coal dealer in Sterling, Illinois, and in 1865 became a banker.

In March 1862 he bought of defendant's agent in Chicago one of their fire proof safes with a Banker's box inside at an entire cost of $300. The price of the box if sold separate would have been $85. The safe and Box were sent to plaintiff at Sterling, and placed in his office, situated in a warehouse about one hundred feet from an inhabited dwelling, and by the side of a R. R. track. The warehouse was built of wood, and had a common wooden door, with glass windows without shutters.

On the night of August 27, 1865 the ware house was entered by burglars and the safe robbed, as plaintiff claims, of $26,405.

The inside box was about 1½ inches thick, made of three different kinds of metal, and secured by Hall's lock. The testimony of one of the burglars was taken, who swore that the safe and box were opened by the use of chisels, a hammer, a pick axe, a crow bar and sledge, as cars passed by. The sledge seems to have done the final work by driving in the spindle of the lock, thus giving access to the revolving tumblers.

The plaintiff brings this suit for the value of the contents, on the alleged ground, 1st, that the safe was warranted to him to be perfectly burglar-proof, and 2d, that as he made known his business, and that he wanted a secure safe, it was not as strong a safe as he ought to have had, and therefore that he had an implied as well as actual warranty and should recover his loss.

The defendants claim on their side that they never warrant safes perfectly burglar-proof, or that when exposed in warehouses or remote buildings, where burglars can undisturbed use any tools or force they please, they will be secure, and that there was no direct or implied warranty in this case.

They also claim that the safe in question was one of their cheapest make and had on their cheapest lock—that plaintiff selected it from a stock of about 100 safes and took the lower priced and less secure safe after being shown the higher priced and more secure ones, on the ground that he did not wish to pay more than $300.

Further that he ought to have had one of their best safes and kept it in a more secure place, for the amount of money he had in it, and thereby he was negligent, not using ordinary care. Such in brief are the leading facts and claims of the parties, and each side made out a very good case.

The case has occupied the Court and Jury for a week, and the judge in an able charge, among other things submitted the question of warranty substantially as follows.

If there was a warranty it must have been one of these three kinds.

1st. That the safe was absolutely burglar-proof, so that no amount of force could under any circumstances open it. If you find this, there will be no damage for its breach, for there is no data to fix the damage. No safe can be made but what can be opened, and in this view you will find for defendants.

2nd. That the safe was the best one made by defendants, and if not, then you will find for plaintiff the difference in price between this safe and their then best safe.

3rd. That the safe was as well made, and of as good material, and as capable of resisting burglars as safes of the class and price to which it belongs usually are; and if the safe in question did not come up to this, you will find for the plaintiff the difference in value between the two safes.

4th. You will find for the plaintiff the amount claimed by him in case you find that defendants falsely and fraudulently represented the safe to be their best when it was not; and that it would resist any and all attacks of burglars, knowing it would not, and that plaintiff believed such statements and was thereby induced to purchase the safe.

5th. The authority of the agent to sell the safe, carries with it the authority to warrant.

The jury being unable to agree were discharged.

For plaintiff, Judge Edmonds & Barlow & Hyatt.

For defendants, S. P. Nash & H. M. Needham.

The only case ever tried of a similar kind was brought by Walker, one of the principal jewelers of London, against Milner, the principal safe manufacturer. Walker's safe was robbed of some £5000 in jewels, and he brought the suit before the Queen's bench against Milner for their value, alleging a warranty. The case was tried about a year since, and found for the defendant.

The final result of this trial is looked for with interest, for in the language of the Judge "it involves millions of money, and the labor of thousands of men."

No man will buy safes if they furnish no security, and no man will make them if made liable for the contents.

Rights of Partial Assignee of a Patent to a Reissue.

IN May, 1863, Andrew Whitely, assignee of a sectional interest in a patent granted to Jonathan Haines, on the 4th September, 1855, applied to the Commissioner of Patents for a reissue of said patent, which was denied examination on the ground that the law did not authorize the Commissioner to grant a reissue to an assignee, unless said assignee held the entire right to the patent. Upon the application of Whitely the Supreme Court of the District of Columbia granted a peremptory mandamus, commanding the Commissioner to refer the case to the proper examiner; whereupon the case was appealed by the Commissioner to the United States Supreme Court, which will soon settle an important question, viz.: whether the assignee of a portion of a patent can surrender said patent and obtain a reissue.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,578.—HOISTING APPARATUS AND CARS FOR MINING PURPOSES.—George Williams Sterling, Colorado. Oct. 6th, 1866.

2,590.—ATMOSPHERIC ENGINES.—David Dick, Meadville, Pa. Oct. 8th, 1866.

2,594.—BRICK-MAKING MACHINES.—Antoine McNair, New York City. Oct. 8th, 1866.

2,626.—APPARATUS FOR OPENING AND CLEANING WOOL AND OTHER FIBROUS MATERIALS.—Charles G. Sargent, Graniteville, Mass. Oct. 11th, 1866.

2,630.—SEWING MACHINES.—Elias Howe, Jr., New York City. Oct. 11th, 1866.

2,666.—APPARATUS FOR TAPPING BEER CASKS AND OTHER LIKE VESSELS CONTAINING LIQUIDS UNDER PRESSURE.—Thomas Marsh, Central Falls, R. I. Oct. 16th, 1866.

2,674.—MANUFACTURE OF REFLECTORS.—William H. Winder, New York City. Oct. 16th, 1866.

2,704. TYPE SETTING MACHINE.—Augustus Corey and John McM. Harper, both of Philadelphia, Pa. Oct. 19th, 1866.

2,710.—POWER LOOMS.—Erastus B. Bigelon, Boston, Mass. Oct. 19th, 1866.

2,714.—MACHINERY FOR MAKING PINS AND NEEDLES.—Orin L. Hopson and Heman P. Brooks, Waterbury Ct. Oct. 20th, 1866.

2,730.—CONSTRUCTION AND ARRANGEMENT OF STEAM BOILERS, AND MEANS FOR COLLECTING SEDIMENT OR DEPOSIT THEREIN.—Joseph A. Miller, New York City. Oct. 22 nd, 1866,

2,726.—FASTENING FOR BALING BANDS.—Robert Dillon, New York City, Oct. 22nd, 1866.

2,728.—PAPER MACHINE.—Richard Smith of Sherbrooke, C. E., and Oliver Ellsworth of Boston. Oct. 23rd, 1866.

2,754.—MANUFACTURE OF PLOUGHS.—Collins Company of Hartford Ct. Oct. 25th, 1866.

2,805.—CONSTRUCTION OF STEAM BOILERS.—Robert Bailey, Idaho City, Idaho. Oct. 30th, 1866.

2,898.—BRAKE FOR RAILWAY CARRIAGES.—Aaron Higley, Joseph B. Birdsell and Varium O. Birdsell, all of South Bend, Indiana. Nov. 7th 1866.

2,900.—PROCESS FOR PRODUCING PICTURES, ORNAMENTAL DESIGNS, LETTERS, CHARACTERS OR FIGURES ON MARBLE AND OTHER CALCAREOUS STONES.—Asa Hill, Norwalk, Ct. Nov. 7th, 1866.

2,932.—INSTRUMENTS FOR TRANSMITTING TELEGRAMS BETWEEN REMOTE PLACES, ESPECIALLY ADAPTED FOR SUBMARINE AND SUBTERRANEAN LINES OF COMMUNICATION.—George Little, New York City. Nov. 10th, 1866.

2,974.—APPLICATION OF BEDSTEADS TO APARTMENTS.—Julia P. Brown Mass. Nov. 13th, 1866.

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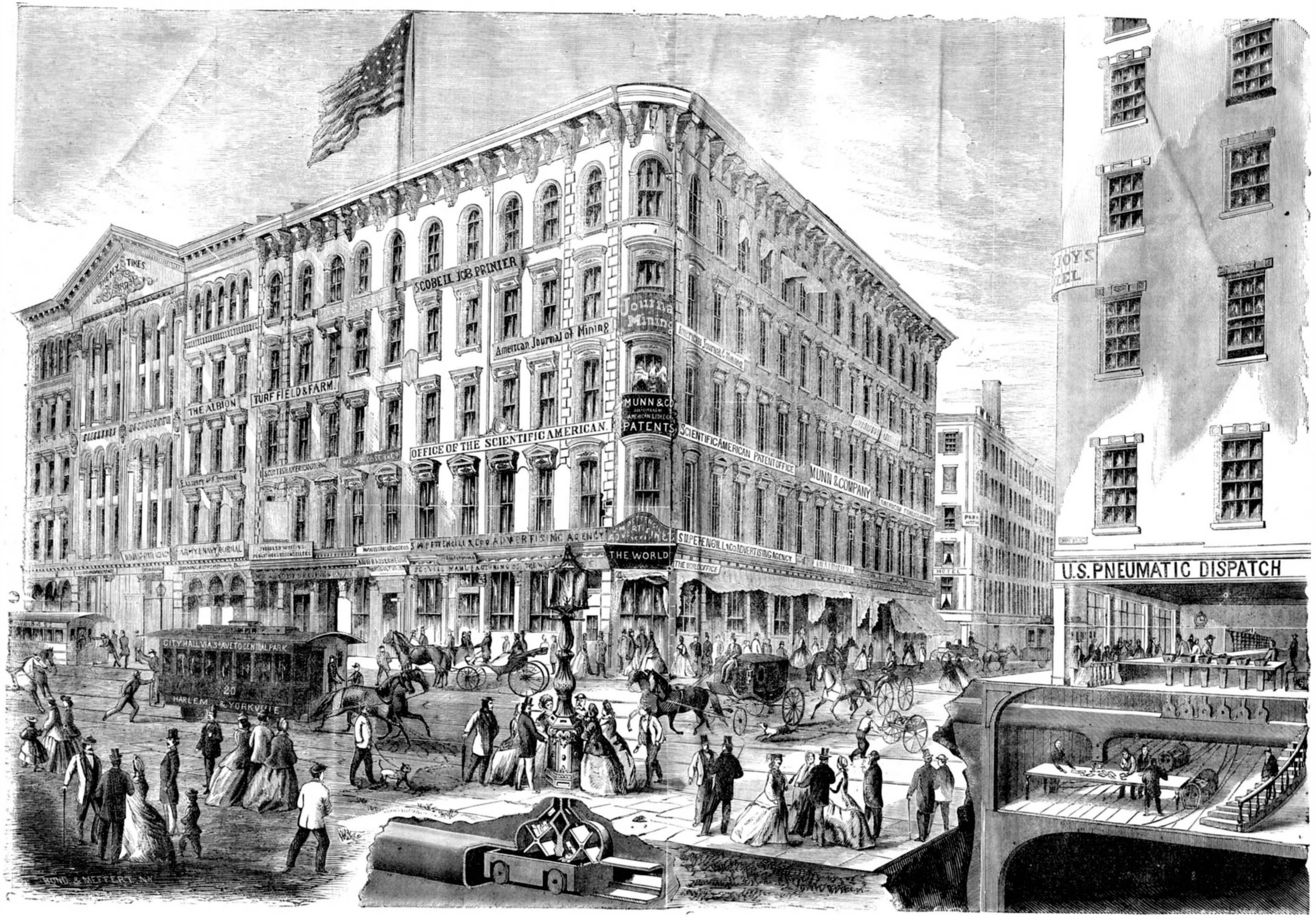

ILLUSTRATIONS OF THE PNEUMATIC POSTAL DISPATCH, AND VIEW OF THE SCIENTIFIC AMERICAN OFFICE, NEW YORK. [SEE PAGE 1.]

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THE
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VOL. XVI., No. 1....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, JANUARY 5, 1867.

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(Illustrated articles are marked with an asterisk.)

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ADVERTISERS.

The value of the SCIENTIFIC AMERICAN as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the liberal terms offered in our advertising columns. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cts. per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand. The value of an advertisement depends chiefly upon the circulation that is given to it.

CONDITION OF THE PATENT OFFICE.

The Patent Office building was commenced in 1836, and 270 feet of the south side of the block were finished and occupied within four years of that period. It is one of the most magnificent public buildings in the world, an ornament to any age or nation.

The order of architecture adopted for the exterior is the Grecian Doric of the age of Pericles, when the fine arts in Greece, particularly architecture and sculpture, had reached the highest excellence. The details are modeled after the celebrated Parthenon, erected on the Acropolis at Athens, which is now in part standing, the marbles having indurated to such a degree by an exposure of more than 2200 years to the atmosphere, as to resist the action of a chisel.

It was the intention of the projectors of the Patent Office, that it should be employed exclusively for the legitimate purposes of its creation, and from time to time as the work progressed Congress appropriated from the surplus patent fund the money necessary for its completion. The last grand hall of the north wing was fitted up in 1865, and formally taken possession of as a receptacle for models. In 1851, Mr. Stuart, at that time Secretary of the Interior, fixed his eye upon the Patent Office and coveted its spacious apartments for the use of his department. At that time it so happened, unfortunately, that we had a very weak person as Commissioner of Patents, who coolly and deliberately reported to Congress, "that the two wings of the Patent Office be finished, and that they be appropriated to the accommodation of the Department of the Interior and the different offices attached thereto." The SCIENTIFIC AMERICAN protested most energetically against the proposition. We thought of the old fable of the porcupine who, wanting shelter for himself, was admitted to share the hospitality of a nest of snakes, but they were so annoyed with his sharp, prickly quil s, that they soon repented of their easy compliance, and entreated the porcupine to withdraw. "No," says he, "let them quit the place that don't like it: for my part, having got in. I am well enough satisfied as I am." When this scheme was maturing, we stated in the SCIENTIFIC AMERICAN, Vol. 7, 1851, that "the wings of the Patent Office should belong to the Patent Office and no other Department. *for if absorbed by any other Department now, when they are required for patent purposes, it will be no easy matter to get them, and required they must be at no distant day.*" The very number of the SCIENTIFIC AMERICAN which contained these words, published a list of only *ten patents* issued for the week ending January 21, 1851

The condition of the Patent Office today, furnishes a powerful confirmation of the warning we then uttered against surrendering any portion of the Patent building to the Department of the Interior; and though Æsop has been dead over two thousand years, unless inventors and those who feel an interest in the future of the Patent Office, unite in firm opposition, his old fable of the porcupine and the snakes is likely to be repeated. In the year 1850, just before the plan was laid to plunder a large share of the Patent Office for illegitimate purposes, there were about twenty-two hundred applications for patents. In the year 1866, when the Patent Office is cramped into the stocks like Titus Oates, the President informs Congress in his annual message that over 14,000 applications for patents were filed during the year ending Oct. 1st. A recent visit to the Patent Office and a careful inspection of its condition revealed to us a state of things which demands an energetic remedy.

It is the duty of Congress at its present session to appoint a committee to inquire what further legislation is necessary to provide for the present and prospective wants of the Patent Office.

The committee will find upon investigation that the Commissioner is very conscientious in the discharge of his duties, anxious to satisfy the pressing demands made upon his time and patience, and to do justice to all who have claims before his department: they will also find some of the Examiners happy and contented, others sullen and moody; the state of mind very much depending upon the pressure of cases referred to them for examination. By calling on Mr. McCormick, the committee will find that the balance sheet shows a surplus fund of about $230,000; an increase of $100,000 in the past year, an amount cheerfully paid by inventors, who are entitled to much better facilities than they now receive. The committee should then look into Prof. Page's room, where they will find six clerks and six Examiners breathing a stifling atmosphere and occupying a space just about large enough to accommodate comfortably two Examiners. In Dr. Jayne's room are four tables and four Examiners, where there should be but two; and as for Dr. Hedrick's room, we undertook to visit him and were repulsed by the formidable front of bottles, documents, desks, etc. His bureau resembles Holbein's picture of the old Alchymist. In short, not to speak of Peale's sepulchre of fine arts, the examining force of the Patent Office is wholly inadequate to do the duties imposed, and wretchedly uncomfortable, and unless a remedy is at once applied, the business will decline.

The Commissioner ought to use all the power he possesses under the law authorizing temporary clerkships, to meet and remove one of the difficulties of which we complain. The examinations are much further behind than they ought to be.

The committee will also find that the Patent Office at this very moment actually needs nearly, if not quite, every available room in the building, and no time should be lost in preparing for the removal of the Secretary of the Interior with his pension bureau, land and Indian traps; they have no business to encumber the Patent Office, and if Congress means to legislate wisely and well, for one of the most precious boons ever conferred upon the people, provision will speedily be made to relieve the Patent Office from present embarrassment and its forces strengthened by adequate legislation. The Patent Office is a self-supporting institution—will not Congress pay some little attention to its wants?

CORROSION OF STEAM BOILERS.

The process of corrosion is very similar to that of the combustion of fuel, the only difference being that in corrosion the metal unites with the corrosive agent slowly, while in combustion the fuel unites with the supporter of combustion rapidly.

The external corrosion of a boiler is due to simple oxidation caused by atmospheric exposure principally. In the boilers of sea-going vessels it is also caused by the contact of the bottom of the boiler with bilge water, and by the exposure of the top to leakage from deck. The best means of preventing this is to cover the top with felt and sheet lead soldered at the joints, and to keep the bottom thoroughly painted.

The internal corrosion is due to simple oxidation and to the galvanic action taking place whenever two different metals or a metal under different conditions are either wholly or partially immersed in a fluid in which either of them would be oxidized; that is, united with the oxygen of the corrosive agent; and which has the effect of confining the corrosion principally and sometimes wholly to one of the two metals in contact. The sheets are eaten away around the rivets before the rivet is injured, on account of the iron in the rivet being in a different condition from that in the sheet, owing to its being more dense from being hammered until cold, and consequently producing a galvanic action by which the sheet is corroded. Tube sheets are apt to leak, when the sheet and tubes are composed of different metals, from the effect of the galvanic action produced by them.

The hot brine or sea water contained in marine boilers is a most powerful corrosive agent of wrought iron. Hence the stays are corroded and the pins or bolts which hold the stays are eaten and loosened. A very thin film of scale is the best protection against this kind of corrosion. The corrosion of the steam drum is caused by the high temperature of the uptake, about 600° Fah. for natural draft, thereby super-heating the steam and oxydizing the iron in a similar manner to the making of hydrogen gas by sending steam over red-hot iron. Boilers not in use are liable to corrosion on the fire side of the heating surface as well as on the water and steam side. To prevent this the smoke stack should be covered over to keep out rain and moisture, the man-hole plates taken off so as to allow a free circulation of air inside, and a light fire of shavings should be built occasionally to dispel all moisture.

THE usual weekly issue of Patents for Dec. 25th will be suspended on account of the holidays.

THE SCIENTIFIC AMERICAN OFFICE.

The engraving upon the opposite page presents a fine view of the Scientific American and Patent Agency Office, which extends through from Park Row to Nassau street, with fronts on both streets; also occupying the whole front on Beekman street, as shown by our signs. The north end of the block is covered by the beautiful buildings of the New York *Times* establishment.

Few persons would recognize this block as the former location of the Old Brick Church, yet it is the veritable spot. Little we thought, years ago, when our then diminutive quarters were in Fulton street, and we used to meet the reverend pastor of the Old Brick, Dr. Spring, striding down Broadway on Sunday, dressed in flowing gown of black silk, wending his way to pulpit—little we thought that we should ever address the public from the same stand-point. But the Doctor and his Church, and the peaceful dead that once reposed within its gates, have been removed. Three miles up town, there on Fifth Avenue, crowning Murray Hill, stands the new Brick Church, and there the venerable pastor is still to be found, engaged in pious labors, surrounded by a large, affectionate and active congregation.

The Scientific American Patent Agency Office is by far the largest establishment of its peculiar class in the world. Our New York offices probably exceed in extent, the area of all other patent agencies in the city combined. In Washington we also have larger and better offices than any others in the profession. Our wide-spread reputation as Solicitors, and our unequalled facilities and success in obtaining Patents for inventors, based as they are upon an experience of nearly a *quarter of a century* in the business, naturally excite the envy of rival patent agents, especially of new comers. They consider themselves particularly fortunate if they can locate near our doors, and by a display of flashy signs, delude inventors into the idea that theirs is the true Scientific American Office: they live upon the few crumbs thus picked up. But after all, the old Scientific American Patent Agency never enjoyed a greater share of the public confidence than at the present moment, and we shall continue by honest industry to deserve it.

DRAINAGE AND UTILIZING WASTE OF CITIES.

A novel system of drainage for the houses of cities, patented by Captain Liernur, is about to be introduced at the Hague, the residence of the king of the Netherlands and a town of 80,000 inhabitants. It consists of an arrangement for daily inodorous emptying and scouring of the passages for excretæ, by pneumatic action, and the immediate removal and utilization of the products, without allowing time for the pestilential process of fermentation, which evolves the intolerable gases of our ordinary sewerage. The absence of water in the products removed, is of no little advantage for fertilizing purposes A plow which at once distributes and covers these products beneath the soil, forms another item of the apparatus. The system of house excretion is quite simple. A straight vertical water pipe extends from the basement to the top of the house, and emerges open, like a chimney. Into this the necessary openings are made, on each floor if desired, with air-tight lids, but entirely clear of valves, traps or other machinery. A strong current of air sets through them in the direction of the outlet above, whenever they are opened. All the house pipes connect with a street pipe, which ends in a reservoir of boiler-iron sunk beneath the roadway at the principal street-crossings: the whole being constructed air-tight. Each house-pipe is closed by a valve operated at the edge of the sidewalk. Every night a sufficient number of wagons go their rounds, each provided with a powerful air-pump, steam engine, and detachable tender carrying an air-tight reservoir. First, the air-pump is coupled to the reservoir beneath the street crossing, and a sufficient vacuum created. Then the valves of the house pipes are opened, one at a time, with a sudden movement. The pressure of the air from the open top of the pipe has already forced the contents as far as the valve, and on opening it, the mass is shot into the reservoir, with a rush of air like a concentrated hurricane scouring the interior of the pipe throughout. Experiment, it is said, has shown this necessary work to be very thorough. Each valve is again closed before another is opened, and during this process, the steam engine continues its work, maintaining the vacuum. When all the valves have been opened and closed, the tender reservoir is coupled on, and the contents of the street reservoir are thrown into it by pneumatic pressure, When filled, it is met and relieved by another tender, and goes its way to the poudrette manufactory; or the reservoir is shipped to the nearest rural station and there decanted into the barrel reservoirs of the patent plow and emptied under the surface of the soil.

The economical estimates reported are as follows: One steam-engine of 10 or 12 horse power, with three tenders of 90 cubic feet each, suffices for the nightly service of a population of 10,000; working seven or eight hours. The quantity removed is one pound and three quarters or 48 cubic inches per day, for the average of all persons; the liquid being to the solid as a little more than six to one, and much the more valuable intrinsically. The least agricultural value of the fertilizing products in Europe, is stated at one shilling sterling per cubic foot; making the income from this source, if the work were performed without charge to the inhabitants, over $22,000 per annum for the services of one engine truck and three tenders, requiring half a dozen horses and as many men, with some further charge for fuel and freight to the country.

In the city of New York, probably a full half of all this agricultural wealth is wasted in the sewerage, and at the same time converted into a source of disease instead of profit. After all this waste and mischief, however, we are informed that there remain, at the very lowest calculation, 500,000 cart-loads or 25,000,000 cubic feet of night-soil, carried out of

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the city in the most primitive and offensive manner, at the rate of 2,000 loads nightly, for 250 nights of the year. This, or all it can use, the poudrette manufacturing company takes of the city at $4,000 per annum, while the city pays $17,500 per annum for carrying it to that liberal purchaser. At the European valuation, this manure, allowing half of it to be rubbish, would be worth $2,750,000. At a low American valuation, say five dollars per hundred feet, it would amount to $312,500, or, for the whole city, $625,000. Hints from this system might be profitably adopted in villages, and even by the builders of isolated houses.

New Method of Removing Hyposulphites from Photographic Prints.

Messrs Tichborne and Robinson of Dublin, have ascertained that *chloric* and *perchloric acids* completely oxidize weak solutions of hyposulphite of soda. The following are the author's directions for carrying it out in practice:—Prepare a solution of twenty-four grains of chlorate of baryta in each ounce of water, and add to this quantity twenty minims of perchloric acid (of about 12 per cent). This is the eliminating liquid. Take a porcelain or other dish, and place in it a pint of hot water, then add two ounces of the above solution. The bath is now ready. Having washed the prints sufficiently in the ordinary way, plunge them into the warm eliminating bath, and let them remain there for an hour or so. They afterwards need only be washed with plain water in order to cleanse the print, then to be dried and mounted.

The process is undoubtedly a simple and economical one. The question then arises—Is it effective? On this, the chief point, we cannot offer any decided opinion, as our experiments are not yet completed in this direction; but, so far as we have gone, the results have been decidedly encouraging. Messrs. Tichborne and Robinson have produced prints in which nothing could be desired in point of tone, showing no evidence of bleaching action, and which are stated by Mr. Tichborne to be perfectly free from all traces of hyposulphite. One of these lies before us as we write, and it speaks well for the success of the process.

We hope to lay before our readers a full account of our experiments, and such details as may be necessary for the satisfactory working of the new method.—*British Journal of Photography.*

"PHOTOGRAM."

A correspondent proposes to rectify a manifest error introduced of late years into our language, in the progress of invention. "Photograph" has a termination devoted to the verb active, or otherwise to the name of the agent: "*photogram*" is the proper form for the name of the effect or product. The suggestion is unimpeachable. The same argument by which the introduction of the word "telegram" was successfully enforced requires us to accept "photogram." We might as properly speak of sending a telegraph, as of buying a photograph. Both are abhorrent to classical order. The reason is, that *graph* is the root of the present active—to write, or, using the participle substantively, anything writing: while *gram* is the root of the perfect participle passive—written, or, substantively, anything written.

Positions of the Crank and the Piston.

I have no desire to enter into any controversy upon this subject, nor yet to be placed in a false position in the minds of the readers of the Scientific American, as I value their good opinion too highly to lose it by hasty statements.

I have said in a former letter that it was not of any importance to know the relative position of the crank and the piston in setting valves, *but I have not said* that the crank and the valve had no relation to each other. Their true relations will be found by considering the indicator diagram which shows us exactly where the steam enters to the piston, how far it follows, how much it expands, the amount of compression at the end of the stroke, and other matters not necessary to consider in this connection. All this we read as in a printed page. Now what do we do when we find errors in the diagram? Alter the crank? No, sir: we alter the eccentric, and the crank takes care of itself; for the economy of the machine depends on the eccentric and valve, all other things being equal.

No valve can be set exactly right without an indicator card to rectify errors of adjustment. Exceptions occur to this statement as to all others, but they are only accidents and not reliable, for reasons well known to all well informed engineers.

Many persons confound the velocity of the piston at different points of the stroke with the relative position of the crank and the piston. These things are, I hardly need say, entirely different and have no connection with each other.

I shall not intrude upon your attention again, Mr. Editor, as there is no room for argument in this matter, and I thank you for your courtesy in giving me a hearing.

Egbert P. Watson.

A comparison of the expenses of British and American government throws light upon the contrast between the condition of the common people under republican and under aristocratic rule. With a larger population, our civil service costs but about two-fifths that of Great Britain, or twenty-nine millions against seventy-three millions of dollars per annum.

The culture of the pomegranate is attracting attention in California. A gentleman at Martinez has a large plantation of this fruit in bearing. It is said to be nearly as easy to cultivate as the peach.

Numeyer's inexplosive gunpowder is about to be tested by the British Government.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING DEC. 18, 1866.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

60,457.—Cotton or Hay Press.—James S. Allums, Cusseta, Geo.

I claim the mode herein described of constructing the frame and supporting the same by strong iron rods in the manner and for the purpose set forth.

Also the combination of the frame so constructed with the modes of supporting the frame and the screw in the manner and for the purpose set forth.

60,458.—Blacksmith's Forging Apparatus.—Leonard and Ira Andrews, Biddeford, Me.

We claim the arrangement of the treadle, c, link, d, crank shaft, a, balance wheel, b, truck, f, shaft, i, having the truck, h, and cam, k, hammer, m, and anvil, t, in order to constitute, when the trucks, f and h, are connected by a belt, a machine which can be operated by a single person, in the manner herein set forth, and working as described.

60,459.—Steam Generator.—William C. Baker, New York City.

First, I claim the partition, p, dividing the front from the rear of the boiler when combined with a tubular boiler constructed as herein set forth and directing the heat in its course between the tubes as, and for the purposes, described.

Second, I also claim the supplemental water chamber, g, combined with the circulating tubular boiler as specified.

Third, I also claim the additional steam chamber, C', connecting with steam chamber, s, substantially as and for the purposes set forth above.

Fourth, I also claim the connections or bends which bear against and support each other vertically and laterally by which the tubes are supported as and for the purposes described.

60,460.—Apparatus for Cleaning and Hulling Wheat and other Grain.—E. P. Barrabe, Paris, France.

First, I claim the case, D, and its plates, c, in combination with the shaft, C, and its plates, b, when each of the latter plates is greater in diameter than the plate next above it for the purpose specified.

Second, The dividing shaft, E, and disk, d, in combination with the shaft C, it is adjustable roller, f, and the lever, k, or its equivalent, the whole being arranged and operating substantially as set forth.

60,461.—Plow.—Ira W. Bartlett, Otter Creek, Ill.

First, I claim the axle and wheels, E G G', combined with the rod, H, and lever, I, when employed in connection with the beam, A, for governing the depth of the plow as herein set forth.

Second, The combination of the ratchet bar, l, and set screw, n, with the toothed colter bar, L, arranged and operating as herein set forth.

60,462.—Preserving Fruits, Meats, and other Substances.—E. S Bartholomew, Westfield, N. Y. assignor to himself and C. H. Ballow, Cleveland, Ohio.

First, I claim the combination of the air pump, B, and close combustion retort, D, receiver and purifier, G, provided with the perforated coil, h', with the hermetical preserving chamber, A, arranged and operating substantially as set forth.

Second I also claim a preserving chamber formed with inclined or converging sides a a, in combination with the several eduction pipes, c c, and main eduction pipe, b, when used in combination with an exhausting pump, B, or equivalent, substantially for the purpose described.

Third, I also claim the sulphurous acid gas generator, E, in combination with the retort, D, and induction tube, f, when used in connection with the air pump, or equivalent for the purpose described.

Fourth, I also claim the employment of sulphurous acid gas in preserving meats, by injecting a small percentage thereof into the preserving chamber, in combination with the nitrogen and carbonic acid gases, substantially as set forth.

60,463.—Low Water Detector.—B. H. Bartol, Philadelphia, Pa.

I claim the pipe, A, rod, d, and steam whistle, C, constructed and arranged in respect to each other and to a steam boiler, substantially as described.

60,464.—Invalid Traveling Chair.—C. L. Bauder, Cleveland, Ohio.

First, I claim the foot piece, D, arms, E and E', in combination with adjustable back, B, and seat, B' hinged and hung so as to operate conjointly as and for the purpose substantially as set forth.

Second, The lips, I I', in combination with the arms, E E', and hinged foot piece, as and for the purpose set forth.

Third, The bracket, C', consisting of two arms, n n', in combination with the levers, e, connecting rod, d, link, c, and chair arranged as and for the purposes set forth.

60,465.—Railway Car.—G. and G. T. Benjamin, and H. S. Weston, Millersburg, Ohio.

We claim the double window, B B', the rod, D, and deflector, F, in combination with the car, as arranged in the manner and for the purpose herein set forth.

60,466.—Metal Plated Sole.—Erastus Blakeslee, Plymouth, Conn.

I claim plating soles for boots and shoes with strips of metal, when the said strips are formed and arranged so as to completely cover the face of the sole, substantially as and for the purpose specified.

60,467.—Horse Hay Fork.—C. C. Blodgett, Watertown, Conn.

First, I claim, in combination with the tubular sheath and center rod of a hay fork as described, the slotted claws or barbs, elongated at their end above the pivot d points so that when the claws are projected from the sheath, the said end shall be brought in contact with the sides of the sheath, substantially as and for the purpose set forth.

Second, I claim the combination with the tubular sheath of a hay fork, as described, of a center rod or bar, provided with flanges arranged relatively to each other and to the locking mechanism of the fork in such manner that they shall not only guide and center the rod but also constitute the means whereby its motion in the sheath may be limited or stopped, substantially as herein shown and set forth.

Third, In combination with the center rod or bar, arranged as described, I claim the open-topped tubular sheath and the pin or equivalent device for preventing the withdrawal of the rod from and the rotation of the same within the said sheath, substantially as herein shown and set forth.

Fourth, I claim the herein-described device for locking and unlocking the center rod, the same consisting of a hoop or sleeves, F, loosely encircling the sheath, and combined with the spring, G, and locking pin, h, substantially in the manner and for the purpose herein shown and set forth.

Fifth, I claim the guard formed on the center rod, and constructed and arranged so as to protect the locking and unlocking device, substantially as herein shown and described.

60,468.—Fruit Jar.—Joseph Borden (assignor to T. and J. Bodine), Bridgeton, N. J.

I claim the cover, B, the set screw, D, projecting from the underside of the same in combination with cross bar, E, serving as a nut for the said screw, and adapted to recesses or projections in the neck of the vessel, all as set forth.

60,469.—Carpet Stretcher.—John H. Bosworth, Bath, Me.

I claim the tubular and serrated head as constructed and applied to one of the parts of the staff of the carpet stretcher in manner and for use as set forth.

I also claim the combination of two toothed heads, two bars, and a slide tube arranged and applied together, substantially in manner as hereinbefore set forth.

60,470.—Water and Steam Separator for Steam Generators.—Richard C. Bristol, Saint Clair, Mich.

First, I claim in combination with the steam generating apparatus, A, the vessel, C, disconnected portions, A' B', of the steam pipe and the drain pipe, C', arranged for joint operation in separating the water and steam flowing through the pipe, A', discharging the water through the pipe, C', and the steam alone through the pipe, B', substantially as herein set forth.

Second, I claim the within-described arrangement of the vessel, C, and its connections relatively to the boiler, A, so that the water separated from the steam and descending in the pipe, C', shall flow directly back to the boiler without the necessity for intervening mechanism, substantially as and for the purpose herein specified.

60,471.—Means for Propelling Vessels.—Charles W. Cahoon, Portland, Me.

I claim the application of the undulatory motion of the sea to the propulsion of vessels by means of pumps, and substantially as described.

I also claim controlling the movement of the connecting rods by which the pumps are actuated so that the length of stroke of the pistons may be governed, substantially as described.

60,472.—Tanning.—Joseph W. Calef, Salisbury, N. H. assignor to himself and John R. Folsom, Stoneham, Mass.

I claim in the process of tanning the employment of the ingredients first described, when used as and in the proportions substantially as set forth.

I also claim, in combination with said tanning ingredients, the employment of the material for hardening sole leather, substantially as set forth.

Also, the employment of the preservative solution in connection with the tanning process, substantially as set forth

60,473.—Churn.—Alexander Carbnow, Potsdam, N. Y.

First, I claim the arms, B B, the standard, E E, or their equivalent as arranged and combined with a drive and pinion wheel, and connected with a tub or churn for the purposes herein specified.

Second, I claim the arms, K K K K, with the paddles, l l l l l, the breakers, m m m m and n n n n, as represented in figures, 2 3 and 4, or their equivalents, for the purposes herein specified.

Third, I claim the peculiar arrangement of the arms, B B, the standard, E E, the drive wheel, f f, the pinion wheel, h h, and the shaft, l l, and their peculiar combination to and with each other for the purposes herein specified.

Fourth, I claim the peculiar arrangement and combination of the paddles, l l l, etc., and the breakers, m m m m and n n n n, for the purposes herein specified.

Fifth, I also claim the adjusting of the drive wheel, f f, to the pinion wheel, h h, for the purposes herein specified.

60,474.—Air Engine.—Peter Chick, Taunton, Mass.

I claim, First, The inverted semi-sphere in the upper portion of the fire box substantially as shown and described.

Second, The semisphere in combination with the fire box, substantially as shown and described.

Third, The arrangement of the water injection pipe in such a manner that it may be withdrawn at any time, substantially in the manner shown and described.

60,475.—Computing Machine.—John H. Chidester, Cleveland, Ohio.

First, I claim the series of disks, D, and toothed wheels, B, arranged upon the shaft, G, in combination with the case, A, index openings, b b b, and numeral openings, a a, arranged and for the purpose set forth.

Second, I claim the notches, c, and flange, F, of the discs and wheels, B, provided with a series of numerals, in combination with the spring, h, recess, C, and shaft, G, arranged in the manner and for the purpose set forth.

Third, A computing machine when constructed, arranged and operating in all its parts, substantially as herein set forth.

60,476.—Carpet Lining.—George W. Chipman, Melrose, Mass.

I claim as an improvement in the manufacture of carpet linings, the construction herein described, viz.: a lining in which a thin sheet of fibrous material is confined between two sheets of fabrics of close texture, by reason of the edges of said sheets being cemented together.

60,477.—Distilling Apparatus.—John A. Coffey, London, England.

I claim the improved constructions and arrangements set forth in regard to the distillatory portions of such apparatus, it being understood that I do not claim any of the mechanical details *per se* and apart from the purposes of my said invention.

60,478.—Paint for Coating Wood, Stone, etc.—William Coggeshall, Springfield, Ohio.

I claim, First, The method herein described for coating substances by the application, dry, to properly prepared surfaces of the hereinbefore described crude article or any equivalent compound substantially as set forth.

Second, The use of the aforesaid crude article or any equivalent substance in combination with any coloring matter when applied dry, substantially in the manner set forth.

60,479.—Car Coupling.—V. and E. Cole, Detroit, Mich.

We claim the pin, a, with its rubber spring, b, and pointed link, B, arranged to operate with the headed slide, B', spring, C, and bar, E, in the manner and for the purpose herein specified.

60,480.—Vapor Burning Stove.—O. K. Collins and William B. Grover, Woodbury, N. J.

We claim the burner, B, consisting of the chamber, y, communicating with an elevated reservoir, the flange, b, and disk, c, with the intervening annular space, x, communicating with the said chamber, y, the whole being arranged substantially as and for the purpose described.

Second, The combination of the above with the pipe, f, and valve, g.

Third, The gas generating burner, B, in combination with a pipe, F, water tank, G, and valve, i, and pipes, c' and E.

60,481.—Door Spring.—James M. Connel, Newark, Ohio.

I claim the hollow slotted mandrel, C, or its equivalent, provided with a tongue which projects into the arm, G, substantially as specified.

Second, The mode of journaling the mandrel, C, or its equivalent on the studs, B, projecting into the casing, K, and attached to the base plate, A, substantially as described.

Third, The coils, D, in combination with the hollow slotted mandrel, C, or its equivalent, the tongue, C, and arm, G, substantially as described.

Fourth, The arrangement of the coils as conical frusta upon a core or mandrel of corresponding character as and for the purpose described.

Fifth, The arrangement of the arm, G, and the semi-cylindrical portion, G', rotating between guides, K K, on the casing, K, and occupying in the rear, the enlargement, K', substantially as described.

Sixth, The recesses, e, for securing the tangential prolongation of wire coil, substantially as described.

Seventh, The general combination of parts consisting of the mandrel, C, or its equivalent, tongue, c, coiled springs, D D, arm, G G', casing, K, studs, B B, and base plate, A', substantially as described.

60,482.—Hammer.—David T. Crockett, Newark, N. J.

I claim a hammer, screw driver, and tack extractor combined as shown, formed of one piece of metal as a new article of manufacture.

60,483.—Corn Planter.—Isaac Crum, Port Union, Ohio.

I claim in combination with a hoe or its equivalent, having tube a, and aperture, e, the distributing plate, g, constructed and operating as above described and set forth.

60,484.—Apparatus for Finishing and Boxing Paper Collars.—John J. Currier and Samuel Wells, Jr., assignors to themselves and James H. Plaisted, Boston Mass.

We claim, First, A machine for finishing and boxing shirt collars made of paper or other material, consisting of the rollers, B C and D, cylinder, E, piston, F, and wheel, P, arranged and combined substantially as described.

Second, The combination and arrangement of the cylinder, E, piston, F, and rollers, B C and D, substantially as and for the purpose specified.

Third, The wheel, P, and the devices for moving the same, consisting of cam, 10, rod, M, belt crank, Q, arm, R, ratchet wheels, U and X, arm, V, lever, S, rod, L, and spring, N, substantially as described.

Fourth, The combination and arrangement of the cylinder, E, piston, F, and wheel, P, said wheel having devices attached for giving it an intermittent motion substantially as described.

Fifth, The combination and arrangement of the cylinder, E, piston, F, shaft, G, lever, J, ring, H, rods L and M, spring, N, and cam, 10, substantially as and for the purpose specified.

60,485.—Saw Mill.—James Davis, Buffalo, N. Y.

I claim, First, The placing of the saw arbors, D, in sliding frames, C C, arranged with gearing and racks substantially as shown and described to admit of the saws, G, on the two arbors, D D, being adjusted simultaneously toward and from each other by the turning of a single, I, as and for the purpose specified.

Second, Adjusting the plates, M, upon shaft, L, by means substantially as described, in combination with the adjustable slide, J, as and for the purpose set forth.

Third, The two carriages, O O', provided with the dogs, P P, and operated through the medium of the drum, R, and chains, Q Q, all constructed and operating substantially as shown and described.

60,486.—Saw Mill.—James Davis, Buffalo, N. Y.

I claim adjusting the roller, N N', by means of bars, d, levers, O, weights, S, notched bars, P, guide, Q, and wedges, R, as and for the purpose specified.

60,487.—Railroad Switch.—S. T. Denise, Branch Port, N. J.

I claim the bars or rails, F, provided with swiveled pieces, G and H, respectively, substantially as and for the purpose described.

60,488.—Wearing Apparel made of Paper.—A. T. Druison, Poland, Maine, and E. P. Furlong, Portland, Maine.

We claim, as our invention, the new manufacture, consisting of articles of wearing apparel made, in whole or in part, from paper formed into crinkles or flexures while in a pulpy or semi-pulpy condition, substantially as set forth.

60,489.—Dumping Wagon.—Daniel Dennett, Buxton, Me.

First, I claim the tail board, D, with its oblique sides, so arranged as to enable the body to tip between the fore and rear axles of the wagon, substantially as described.

Second, I claim the combination of the tail board, D, with its oblique sides, beams, A A, and rod, B, all arranged as described for the purpose specified.

60,490.—Heat Radiator for Stove Pipes.—Emanuel Detwiler, Milwaukee, Wis.

First, I claim the T, iron ribs or braces, A, combined in relation with the flues, d g, substantially as herein set forth for the purpose specified.

Second, The horizontal flues, d g, and vertical flues, E, arranged in relation with each other and with the flues, M N, and the pipe, D, substantially as herein set forth for the purpose specified.

60,491.—Igniting Illuminating Signals.—Jacob J. Detwiller, Greenville, N. J.

First, I claim arranging the fuse or quick match, C, in connection with the signal, and the stock, A or B, substantially as shown and described for the purpose specified.

Second, Making the stocks, A and B, with a hole, d, in its axis, in combination with the transverse hole or groove, e, to receive the end of the match and the fire from the percussion cap, substantially as set forth.

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Third, Enveloping the signal and capping the lower end of the stock in a metallic case, for the purpose of protecting it from punctures and dampness substantially as shown in Fig. 12, and as described.

60,492.—BONE BLACK KILN.—Edward P. Eastwick, Baltimore, Md.

I claim connecting two or more vertical retorts by means of intervening bed plates and adapters or couplings resting in the floor of the upper chamber of the bone black kiln, supporting the upper retorts independently, and allowing a separate expansion and contraction of the lower retorts, substantially as herein described.

60,493.—CHURN, BEER COOLER, ETC. — Samuel S. Elder, Springfield, Ill.

First, I claim the combination of the hexangular casing, A, and dashers, D" and G', revolving in opposite directions, when respectively constructed and arranged substantially as set forth.

Second, I claim the combination of the dashers, D" and G", when carried in opposite directions upon a system of shafts, F F' and G, and collar, D' and D"', arranged and operated substantially in the manner and for the purpose set forth.

60,494 —COMB.—James Emerson, Lowell, Mass.

I claim, First, The comb, A, when made in the proper form to fit the upper lip, with guards in front to hold the moustache, when made substantially as described.

Second, I claim the nippers, i i, in combination with the comb, for the purpose of holding the comb in the moustache as described.

60,495.—WAGON WHEEL.—Benjamin M. Esterle, San Francisco, Cal.

I claim, as my invention and improvement in carriage wheels, the use of the plate, E, constructed as shown in Fig 3 of the drawings, so that it may be used on the inside of the front wheels of a wagon, and pass or slip over the lock or friction plate fastened to the carriage for the wheel to rub against in turning the wagon.

60,496.—STEAM GENERATOR.—Henry Feyh, Columbia, Ohio, assignor to himself and George T. Emory. Antedated September 13, 1866.

First, I claim pipes or tubes of different diameters, arranged so as to be exposed to the direct action of the fire, and connected at one end for producing a forced circulation of water in steam boilers, substantially as described.

Second, The combination of the feeding pipes, c, leading from the water space and below the water level, with the end couplings, G, and with pipes leading from said couplings above the water level in the boiler, substantially as described.

60,497.—ROCK DRILL.—C. D. Foote, Fond du Lac, Wis.

First, I claim in drilling machines of the character above described, so arranging the cylinder and its attachments that the same shall be fed up to their work, substantially as set forth.

Second, Mounting the cylinder and its attachments upon a horizontal frame, hinged to the side of main frame, so that the drilling mechanism may be swung out of line with the hole being drilled, without removing the main frame, as set forth.

Third, Arranging the cylinder in such a manner as to operate the drill by a blow direct from the end of the piston, substantially as set forth.

Fourth, The rod, F, or its equivalent, arranged to operate substantially as set forth.

Fifth, The drill-holding device, with the opening in its side to permit the insertion or removal of the drill, as and for the purpose set forth.

Sixth, The bar, m, arranged to operate the ratchet wheel, T, for the purpose of feeding the machine forward, substantially as described.

Seventh, The mechanism so arranged as to raise the drill from the rock at its cutting point and return it again at each blow of the hammer, as herein described.

60,498.—STOVE-PIPE DAMPER.—J. Frazer and O. S. Garretson, Buffalo, N. Y.

We claim, First, Connecting the two disks of a pipe damper together by means of lugs, f f', and corresponding slots, or their equivalent, in combination with the axial rod, C, substantially in the manner and for the purposes set forth.

Second, We also claim the two scallop or equivalently-formed disks, B B', combined to form a pipe damper, substantially in the manner and for the purposes set forth.

60,499.—LAMP BURNER.—John A. Frey, Washington, D. C. Antedated Dec. 4, 1866.

First, I claim the square apertures, L, and the perforations, M, of the circular burner, to regulate and keep the burner cool without any metallic tubes passing into or through the oil or fluid.

Second, I also claim the outer air chamber, B, in combination with the apron, N, and spring, T, as herein described.

Third, I also claim the circular guard, F, on the top of the lamp, in combination with the burner, as herein described, to prevent any sudden transmission of air.

Fourth, I also claim the cone-shaped reservoir of water in the center of the lamp, for the purposes set forth.

60,500.—ENGINE FOR THE UTILIZATION OF AMMONIACAL GAS. —Jean Frot, Orleans, France.

I claim the herein-described apparatus, by means of which ammoniacal gas may be substituted for steam in motor engines, the same consisting substantially of a combined condenser and dissolver, arranged as described, in which the ammoniacal vapor is condensed and dissolved continuously as herein described and set forth.

60,501.—POTATO DIGGER.—Allen Gilmore, Fort Atkinson, Wis.

First, The combination of shovel screen, c, screen, D, and revolving tooth, a2, with carriers, f2 f3, applied to a carriage, A, and operating substantially as described.

Second, The arrangement of comb teeth over the shovel, C', in combination with the carriers, f2 f3, substantially as described.

Third, The arrangement of a pressure roller, g', in front of the carriers, f3, and over the shovel, C', substantially as described.

Fourth, Sustaining the shovel screen, C, against backward strain, when said screen is suspended at its rear part from a shaft, b', by means of segments, d' d', and bearings, e e, substantially as described.

Fifth, The clearer, S, in combination with the carriers, f3 f3, substantially as described.

Sixth, Conducting the potatoes from the screen, D, upward and forward, and delivering them at a point which is near the front part of the machine, by means substantially as described.

Seventh, The use of a rake, K, for separating the vines from the potatoes, said rake being arranged on an elevator, and caused to discharge the vines over gate, J, and guard, F, substantially as described.

Eighth, The application of a screen, K, to the inclined bottom of the elevator, for separating the smaller from the larger potatoes, substantially as described.

Ninth, The construction of the screen, D, with a guard, F, upon the near end, substantially as and for the purposes described.

60,502.—SIGNALLING APPARATUS.—John Sacheverell Gisborne, Liverpool, England.

First, I claim the pulley, e, stud, c, pointer, d, and handle, f, arranged substantially in the manner described, as means of giving motion to one or more endless or double-line, flexible, double-motion conductors, K, to give either audible or visible signals or both.

Second, In combination with the above, the spring, g, constructed to fall into the notches, h, in the manner and for the purpose set forth.

Third, The dials, b and i, placed close together, substantially as shown on the drawings, so that they are illuminated by one lamp and can be seen at a glance.

Fourth, The employment of one or more flexible, endless or double-line conductors, K, as means for conveying or communicating motion for operating signalling apparatus, and for conveying or communicating the motion of a rudder stock, substantially as described.

Fifth, The combination of the pulley, o, disk, q, case, n, with opening, x, and motion conductors, K, either with or without the bell or signalling apparatus, substantially as described.

60,503.—CLAMPS FOR GLUEING THE TIPS OF BILLIARD CUES. —Samuel Gissinger, Lawrenceville, Pa.. assignor to himself and David E. Hall, Pittsburg, Pa.

I claim the springs, o, or their equivalent, formed in such a manner as to have a bearing on the cue at two different points of its length, in combination with the conical chamber, i, piston, e, and spring, f, the whole being arranged and operating substantially in the manner herein described and for the purpose set forth.

60,504.—PRINTING PRESS.—George P. Gordon, Brooklyn, N. Y.

First, I claim, in combination with the inking rollers, M, held and carried in a rocking roller frame, I, the use or employment of a third or supplemental roller, M3, whether said third or supplemental roller, M3, shall vibrate or not, substantially as and for the purposes shown.

Second, I claim the grippers, T, to relieve the printed sheet or card from the form or types, constructed and operated substantially as shown.

Third, In combination with a revolving ink-distributing table or disk, N, I claim the use or employment of the inking rollers, and a third or supplemental roller, M3, or its equivalent, for the purposes specified.

60,505.—CAPSTAN.—William D. Grimshaw, Newark, N. J.

First, I claim the combination of the shaft, b, spring, f, nut, g, barrel, e, and ring, d, with the base, a, in the manner and for the purposes specified.

Second, I claim the pawl, o, constructed in the manner specified, in combination with the pointed spring socket, r, wheel, n, and handspike socket, m, as and for the purposes set forth.

60,506.—ENGRAVING.—J. C. Guerrant and B. J. Field, Leaksville, N. C.

First, We claim the arrangement, substantially as described, of the adjustable plates, E F G, with their slots and set screws, in combination with the supporting plate, A, for the purpose and substantially in the manner set forth.

Second, The levers, O O' and Q Q', with the adjustable arm, P, and joints, g and h, arranged substantially as set forth, in combination with the adjustable staff, L, and sleeve, M, for the purpose of allowing universal motion and adjustment to said levers, O O' and Q Q', as set forth.

Third, The vibrating arc, S, and pattern frame, T, constructed, arranged, and operating substantially as described, and for the purpose set forth, in combination with the plate, A, and its adjuncts, as set forth.

Fourth, The arrangement, substantially as set forth, of the stylus or tracing point, m, and its adjuncts, whereby it will be always kept against the pattern as described, in combination with the adjustable sleeve, U, as set forth.

Fifth, We claim the ring holder, Y, with its set screws, r r, or equivalent device, arranged and made adjustable by means of the staff, V, and sleeve, W, substantially as set forth.

60,507.—JACK FOR THE MANUFACTURE OF BOOTS AND SHOES. —Charles M. Gustin, Laccarappa, Me.

First, I claim the combination of the bolt, C, and friction washer, o, to prevent a too easy and ready revolution of the yoke, A, upon the bolt, in a horizontal plane.

Second, The combination of the crank stop, d, sliding in the blocks, e e, with the holes in the segment, C, as and for the purpose specified.

Third, The sliding toe rest on the top of the arm, f, when secured at any point in the manner described and for the purpose set forth.

60,508.—ATTACHING COVERS TO KETTLES, BOILERS, STOVES, ETC.—William Hailes, Albany, N. Y., assignor to himself and S. H. Ransom.

First, I claim securing the covers to vessels or other objects by a pivot connection, in such a manner that the covers will be held down in place by an overhanging hook, C, or its equivalent, substantially as described.

Second, The combination of the hook, h, and the perforated portion, t, with the projection, a, and its stud, b, substantially as and for the purposes described.

Third, The construction of the projection, a, with a stop, c, and a notch, e, formed on it, substantially as and for the purposes described.

60,509.—SPIRAL FRICTION CLUTCH FOR MACHINERY.—James Hanley, New York City.

I claim the friction cord as herein described, and applied substantially to control the movement of machines.

60,510.—SAWING MACHINE.—Henry Hassenpflug, Huntington, Pa.

I claim the arrangement of the slotted arms with respect to the saw frame, in such a manner that the saw may be set at any required distance in advance of the frame, substantially as set forth.

60,511.—COMBINED BLACKING BRUSH AND BOX. — Frank Hatch, La Crosse, Wis.

I claim the combination of an adjustable and attachable liquid blacking reservoir, as set forth in specification and drawings accompanying my application.

60,512.—FILTER.—Thomas Hayes, Cambridge, Mass.

I claim the passages, c d e f, and valves, g h i j, operated by cams, F G, all arranged for the purpose of reversing the current of water through the filterer, substantially as set forth.

60,513.—GRAIN SEPARATOR.—S. Heflebower, Alexander, Va., and J. M. Reed, Loudon County, Va.

We claim the combination of a pressure roller with one or more rollers, with an adhesive covering, to which the cockle will become attached and thereby removed from the wheat, substantially as described.

60,514.—TREATING ORES OF COPPER AND OTHER METAL TO OBTAIN METALS AND OTHER PRODUCTS THEREFROM. —William Henderson, Glasgow, Scotland.

First, I claim the two several improved processes hereinbefore described, for extracting copper from any ore in which it may be found as a salt of copper, whether iron or other metal be or be not found in such ore.

Second, The improved process and processes hereinbefore described, for separately obtaining from the sulphuret ores of copper, silver, zinc, or other metal, the copper, silver, zinc, or other metal therein contained, whether the object be to obtain from such sulphurets one only or all of the metals therein contained.

Third, The manufacture of the product hereinbefore denominated iron powder by the process hereinbefore described, so be used in the processes hereinbefore described, as a precipitate.

60,515.—CAR BRAKE.—A. Higley, South Bend, Ind.

First, I claim the stirrup, L, and spring, M, in combination with the pawl, K, and ratchet, j, arranged and operating as and for the purpose set forth.

Second, The lever, G, and friction coupling, D, in two sections, as set forth, in combination with the pawl, i, ratchet, b, and pulleys, E E', as and for the purpose described.

Third, The swivel, I', bar, H, spring, I, and chains, c d e, in combination with the pulleys, F E and E', arranged and operating as and for the purpose described.

60,516.—FLUX FOR WELDING, PUDDLING, AND BRAZING IRON AND STEEL.—Anthony J. Hindermeyer, Rohrerstown, Pa.

I claim the use of the herein-described compound as a flux for welding and brazing, and as a physic for cleansing and improving iron in the operation of puddling.

60,517.—PADDLE WHEEL.—William H. Holland, Chelsea, Mass.

I claim my improved paddle wheel or propeller as constructed with its main and auxiliary floats, C D, three series of radial rods or arms, and two series of radial auxiliary radial arms, arranged and combined together, and with rings and hubs, substantially as hereinbefore described.

60,518.—PADDLE WHEEL.—William H. Holland, Chelsea, Mass.

I claim the arrangement of the main and auxiliary floats of the wheel with respect to each other and the side frames, substantially as specified and represented, each main float under such arrangement being extended diagonally or obliquely across the entire wheel, and its auxiliary float being made to extend from the middle of the main float at an acute angle thereto and joined to one of the side frames, as specified.

I also claim the arrangement of each main float and its brace or auxiliary so as to stand obliquely in the wheel in directions opposite to those of the next adjacent main float and its brace or auxiliary float, the whole being as represented in the drawings and as hereinbefore described.

60,519.—PIANOFORTE.—G. H. Hulskamp, New York City.

I claim the combination of the wooden bridge, d, and the rest plank, h, with the agraffe, A, substantially as and for the purpose set forth.

60,520. — REPEATING ACTION FOR PIANOFORTES.—Joseph Hurd, Boston, Mass.

I claim for the purpose of supporting the hammer of a pianoforte action near its string in position to give a repeating blow, the combination of an elastic support of the hammer butt, with a lever, o, when this is connected with the key lever actuating the hammer by means of the link, n.

Also the employment of the right and left-hand screw in the link, n, for the purpose of adjusting the position of lever, o.

60,521.—FOOT BATH.—Isaac A. Isaacs, Cleveland, Ohio.

I claim the tube, D, funnel, C, in combination with the perforated bottom, B, guard, b, and pail, A, arranged in the manner and for the purpose set forth.

60,522.—WATCH-CHAIN FASTENING.—Henry Jahne (assignor to himself, Gerrit Smith, and Anthony J. G. Hodenpyl), New York City.

I claim a watch-chain fastening composed of a case, b, containing a spring bolt, c, operated by the guard, f, and provided with the hinged shackle, a, at one end and a ring at the other end, as a new article of manufacture.

60,523.—BARS OR SLATS FOR REFRIGERATORS.—John C. Jewett, Buffalo, N. Y.

I claim the construction of ice racks for refrigerators of bars of wood sheathed and hermetically inclosed in zinc or other sheet metal, substantially in the manner and for the purposes herein set forth.

60,524.—TANNING.—James J. Johnston, Alleghany City, Pa.

First, I claim placing skins of animals in air-tight vats from which the air has been exhausted and then treated with tanning liquid and agitated in the manner and for the purpose described.

Second, In connection with the above the application of hydrostatic pressure in the manner and for the purpose described.

Third, The combination and arrangement of the vats, A B and C, furnished with trunnions, o and e, frames, x, and pressure device, the whole being constructed, arranged, and operating in the manner substantially herein described and for the purpose set forth.

60,525.—CENTER TABLE.—Edwin Lampman, Catskill, N. Y.

I claim the arrangement of the disk, C, as constructed with the leg, A, pin or plug, a, and top, D, as and for the purpose herein set forth.

60,526.—FEMALE SYRINGE.—Simon M. Landis, Philadelphia, Pa.

I claim the funnel-shaped cavities with or without grooves of the syringe bulb tube.

Also the box applicable to spigots of any size in combination with syringe bulb tube, as herein described.

60,527.—FARM GATE.—A. Larrowe, Cohocton, N. Y.

I claim the gate constructed as shown and used in connection with the hooks, d, and pins, c, all arranged to operate as herein shown and described.

60,528.—COTTON-BALE TIE.—R. G. Latting, New Orleans, La.

I claim a buckle arranged with two loops, d g, constructed as described in combination with an angular ridge, c, formed by the depression of the center of the plate, as and for the purpose described.

Second, I also claim the hook, h, or its equivalent, for strengthening the open loop, g.

60,529. — COLLEGE CABINET. — William W. Levering, San Francisco, Cal.

I claim a cabinet constructed as described and having a door serving for a blackboard and held up by the bars, é e', substantially as described.

60,530.—MANUFACTURE OF YARN.—Edward T. C. Lutton, Philadelphia, Pa.

I claim yarn from the entire surface of which the superfluous projecting fibers have been sheared, for the purpose specified.

60,531.—MACHINE FOR FORMING BRIDLE FRONTS.—Ira Manning, Philadelphia, Pa.

First, I claim the guides, B B', either fixed or graduating, for the purpose herein specified and described.

Second, The guides, B B, in combination with the centers, D D', substantially as specified and described.

Third, The guides, B B', in combination with the centers, D D', and the presser, E, substantially as specified and described.

Fourth, The sliding center board or piece, I, substantially as specified and described.

60,532.—MARKING STAMP.—William B. Mason (assignor to himself and Chas. H. Moore), Boston, Mass.

I claim making the face of the type elastic to yield to the small inequalities of the surface printed in combination with a small elastic base (less in area than the face of the type) to yield to the large inequalities of the surface printed.

And in combination with the elastic face and small elastic base, I claim so arranging or holding the solid body of the type in the case that it can rock when required to adapt the surface of the type to the irregularities of the surface printed.

60,533.—DEVICE FOR DETACHING HORSES FROM VEHICLES. —B. A. McConnaughey, New Market, Ohio.

I claim the tugs, D D, connected to the end of the traces and fitting within the openings therefor provided and held by the bar, m, when used in combination with the springs and lever, a, for detaching the horse, substantially as herein set forth.

60,524.—TYPE CASE.—Leonard H. Miller, Ottawa, Ohio.

First, I claim a type case when formed with detachable boxes, B, set nuts or frame, A, substantially in the manner and for the purpose set forth.

Second, In combination with a case, A, and independent boxes, B, I claim a removable partition, C, constructed and used substantially as set forth.

Third, I claim the boxes, B, when constructed with oval bottoms, substantially as described.

Fourth, I claim the boxes, B, when formed with flanges, B', for interlocking the boxes when placed in the case, substantially in the manner set forth.

60,535.—PUMP.—Oliver Miller, Salem, Ohio, assignor to himself and Thomas D. Ball.

First, I claim the chambered chest, E, with its valves, e e', in combination with the cylinder, B B, pistons, b", valves, g g', and induction pipe, A, all arranged in relation to each other and operating conjointly, for the purpose set forth.

Second, I claim in combination with the foregoing cylinders, C C', with the respective plungers, chambers, D D"', and valves, I I", pipe, H, valve, d, and nozzle, G, arranged and operating in the manner and for the purpose set forth.

Third, I claim the chamber, J J', of the chest, E, valves, e e', and openings, m m', in combination with the cylinder, B, pipes, D' D", and chamber, D D"', as and for the purpose set forth.

60,536.—COMPOSITION FOR MAKING SHARPENING STONES.— Robert R. Miller and A. W. Carver (assignors to B. Hoopes and C. Berie), Philadelphia, Pa. Antedated Dec. 5, 1866.

We claim the composition for making sharpening stones, consisting of the materials herein described, combined substantially as specified.

60,537.—RETORTS FOR THE MANUFACTURE OF ILLUMINATING GAS.—Adolph Millochau, New York City, assignor to the American Improved Gas Retort Company.

I claim the platform or false bottom, c, openings or pipes, k, and cap plate, e, in combination with the retort, a, substantially as and for the purposes set forth.

60,538.—COMPOSITION FOR THE CURE OF AGUE.—John Monfort, Jessamine county, Ky, assignor to himself and J. E. Billingsley.

I claim a composition of matter composed, compounded, and prepared, substantially as and for the purpose set forth.

60,539.—ROTARY SIFTER.—Mark F. Morse, Boston, Mass.

I claim the combination and arrangement of the disk, D, its series of cams, g g g, the stud, i, and the spring, l, with the sifting drum, its shaft, and supporting frame, the whole being to operate as specified.

60,540.—BREECH-LOADING ORDNANCE.—William J. Murphy. Cork, Ireland.

First, I claim the barrel, a a, with its opening, d d, and plunger or breech piece, b, in combination with the within-described devices, or their equivalents, whereby the pressure of the water may be caused to operate the breech piece, all substantially as set forth.

Second, The combination of a barrel, a movable breech piece, and a chamber containing a body of water, and so situated that the water will retain the breech piece in its position during the discharge of the piece.

Third, The barrel, a a, with its openings, d d, cylinder, f f, plug, i i, and openings, k l m, or their equivalents, in combination with the plunger, b, and its piston, c, the whole being constructed and operating substantially as and for the purpose described.

60,541.—WHISTLE FOR STEAM AND OTHER ENGINES.—John Murray, New York City. Antedated Oct. 7, 1866.

I claim the above-described whistle, for steam and other engines, as a new article of manufacture, substantially as and for the purposes set forth.

60,542.—SAWING SHINGLES.—Francis B. Northrup, Newark, N. J.

First, I claim sawing a block of wood into shingles or other analogous things having alternate butts and points, by means of a gang of reciprocating saws, when arranged and operated substantially as described.

Second, The projections, c, on the cross bars of the two gates when used in combination with the two reciprocating gates having a gang of saws operating substantially as described.

60,543.—SHOE BINDING.—M. and R. B. Packard, North Bridgwater, Mass.

We claim, as a new article of manufacture, a shoe binding having a construction substantially as set forth.

60,544.—CAR COUPLING.—E. E. Packer, Jr., and John Daley, (assignors to themselves and Edgar L. Thompson), Philadelphia, Pa.

First, We claim the combination of the coupling rod, B, with the cylinder, C, and screw socket, b, of the cylinder, A, substantially upon the principle, and in the manner herein before described and for the purpose specified.

Second, The combination and arrangement of the lever, E, stud, m, link, n, and pawl, o, substantially in the manner described and for the purpose specified.

60,545. — DEVICE FOR FASTENING BLIND SLATS.—William Palmer, New York City.

I claim the adjustable half-elliptic spring, D, as arranged and constructed and for the purposes as set forth.

60,546.—DYEING AND PRINTING TEXTILE FABRICS AND YARN. Alfred Paraf, Mulhouse, France.

I claim the process of developing chromic acid in dyeing and printing operations by the application to the fabric of an insoluble salt of chromium, and the subsequent action of a moist atmosphere, substantially as set forth.

60,547.—SELF-SEALING FRUIT CAN.—Thomas Parker (assignor to himself and Theodore Rube), Germantown, Pa.

First, I claim the construction of a tin can with a glass lid the full diameter of the can, substantially as and for the purpose set forth.

Second, The laying off the top of the can as a bearing for the rubber ring, r r, as shown in fig. 3, substantially as and for the purpose set forth.

Third, The impression of lugs sunk in the body of the can, or their equivalents, substantially as and for the purpose set forth.

60,548.—TANNING.—Julius A. Pease, New York City.

I claim the tanning of hides or skins, substantially as above described.

60,549.—PROCESS OF TANNING.—Julius A. Pease, New York City.

I claim the use of the above-mentioned material for tanning, either alone or in combination with other materials, substantially as described.

60,550.—STRAW CUTTER.—John G. Perry, South Kingston, R. I.

First, I claim the combination of the two-flanged cylinder, G and H, so arranged and geared together that the periphery of the flanges of the cylinder, H, shall move faster than those on the cylinder, G, and be so situated in relation to each other that a shear cut shall be made in the direction of the center of the shaft, G, or radial, instead of tangential, thereto, as shown and specified.

Second, The feed roll, N, having flanges that work in concert with those on the cylinder, G, in combination with one or more cutting cylinders of a hay or feed cutter, substantially as herein described and for the purposes set forth.

Third, Making the flanges against which the knives cut with projections, t t t t, substantially as herein set forth and for the purposes specified.

Fourth, The hub, x, screws, s s, and stud, c, in combination with the wheel, C, and cylinder, G, substantially as herein described and for the purpose set forth.

60,551.—GATE.—E. Petteys and T. C. Leggett, Chestertown, N. Y.

I claim, First, The arrangement with the gate, F, and link hinge, E, of the rock shaft, B, and arms, D D', substantially as described.

Second, The arrangement of the palette, I, plate, L, and arm, D', as and for the purpose described.

60,552.—APPARATUS FOR COOLING AND PRESERVING MEAT, FISH, VEGETABLES, AND OTHER SUBSTANCES.—Charles F. Pike, Providence, R. I.

First, I claim the application of the ventilator, B, or its equivalent, to the Refrigerator, constructed and refrigerated, substantially as herein described and for the purposes herein stated.

Second, The making of the pipes or tubes, D, larger at the lower end than at the upper end, substantially as and for the purpose herein stated.

Third, The combination of the pipes or tubes, D, larger at the lower ends than at the upper ends, in combination with the ice box or receptacle, C, and the water tank, E, or their equivalents, substantially as herein described.

Fourth, The structure of the ice box or receptacle, C, pipes or tubes, D, water tank, E, and its appendages, provision chamber, A, and its fixtures, ventilator, B, or other equivalents, substantially as herein described and for the purposes herein stated.

Fifth, The application of a freezing mixture of salt and ice, or its equivalent, to a refrigerator or structure, substantially as herein described and for the purposes herein stated.

60,553.—FILTER COOLER.—S. Montgomery Pike, Cincinnati, Ohio.

First, I claim the outer metallic case, B, and inner case, C, with their series

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of perforations, b and C', respectively constructed and arranged as and for the purpose above described and set forth.

Second, The cooler, D, having the flutes, d, in combination with the inner case, C, as above described and for the purpose specified.

Third, The outer perforated case, B, the inner perforated case, C, and cooler, D, in combination with the casing, A, of the filter cooler, all arranged as above shown and for the purpose set forth.

60,554.—FAN, BRUSH, AND RACK.—Britton Poulson, Fort Wayne, Ind.

I claim the hereinbefore described arrangement of parts consisting of the bell-formed base, A, rod, B, set screw, B', head, C, and radial arms, D, when said base also encloses the actuating clock work constructed as described, communicating by means of the crank wheel, K, rod, L, and arm, M, a rotary reciprocating motion to the rod, B, and arm, D, in the manner and for the purpose set forth.

60,555.—MANUFACTURE OF LEATHER HOSE.—James and James A. Punderford, New Haven, Conn.

First, We claim forming the joint in leather hose by the application to the surface of the laps of a vulcanizable gum, and curing the same after such application, substantially as herein set forth.

Second, Coating the inner, or outer, or both surfaces of leather hose with vulcanizable gum, and curing the same after such coating, substantially as herein set forth.

Third, Coating the outer and inner surface and the joint or laps by a single sheet of fabricated rubber, substantially as herein set forth.

60,556.—COMBINED POKER, TONGS, WRENCH, ETC.—John Richards, Washington, D. C.

I claim the construction of the fire tongs when arranged and combined with the wrenches, C and J, hook, H, poker, G, and regulating screw, K, as herein described and for the purposes set forth.

60,557.—COMPOUND OIL FOR PAINT, ETC.—Darius S. Robinson, Oswego, N. Y.

I claim the art of mixing, combining, and compounding the aforesaid articles o ingredients, and making a liquid compound or composition called and designated by me "elastic oil," possessing the qualities and answering the purposes of pure linseed oil, or other pure oils, to be used in painting, and all other general purposes for which linseed oil and other pure oils are used.

60,558.—DRYER FOR PETROLEUM AND HEAVY OILS.—Samuel F. Rogers, Malden, Mass. Antedated Dec. 12, 1866.

I claim the within-described petroleum dryer, constructed substantially as set forth.

60,559.—BURNING FLUID.—William B. Rogers, Chicago, Ill.

I claim a burning and carbonizing fluid which is composed of the several ingredients herein mentioned, mixed together in about the proportions specified.

60,560.—STEAM-GENERATOR FLUE BRUSH.—Charles, Jr., and John Ross, New York City. Antedated Nov. 6, 1866.

We claim the construction of a brush for cleansing tubular boilers by combining fused metal among wires, as in figs. 1 and 3, whereby to hold the wires of the brush firm, substantially as set forth.

Second, The arrangement of metal containing wires and cutters, so as to form cutters, and a section of brush as shown at E, figs. 5 and 6, adapted to be put on and off and of the size to fit the tubes to be cleansed, substantially in the manner and for the purpose as herein set forth.

60,561.—FRUIT PICKER.—J. F. Saiger and A. Davis, Shelby, Ohio.

We claim the skeleton spring head, B, tension rod, C, and adjustable screw nut, E, in combination with the hood, D, bag, F, and handle, A, when arranged in the manner and for the purpose described.

60,562.—STEAM GENERATOR.—Herrman S. Saroni, Baltimore, Md.

First, I claim a shallow water drum, or drums, or tubular heater, or heaters, interposed between the burner or burners, and the boiler, substantially as and for the purpose described.

Second, The combination o the boiler with the tubular heater, substantially as described, and so arranged that a space shall be left between them, for the purpose set forth.

Third, The combination of the boiler, tubular drum and burners, substantially as described, so that the drum shall act as a heater cap to the burners, and permit the flame to pass to the bottom of the boiler, as set forth.

60,563.—SOLE EDGE FINISHING TOOL.—Franz M. Schmitt, Jamaica Plains, Mass.

I claim the block, A, provided with opposite flat faces, and polishing surfaces, and separate projections, c d, or the same and one or more notches, e, all substantially as explained.

60,564.—PAN FOR EVAPORATING SUGAR.—Herman F. Schroder, Cincinnati, Ohio.

I claim the provision of one or more hollow disks adapted to receive water, and be hermetically closed. The said disks being adapted for attachment to a common evaporating pan, or kettle, and having a crank or other means of rotation, as and for the purposes set forth.

60,565.—FRUIT GATHERER.—Henry L. Scott, Plessis, N. Y.

I claim the combination with the basket, A, of the shears, E E', when the stationary blade, E, is formed and applied in conjunction with the float strip, e', to form one of the ribs of the basket, and when the several parts of the instrument are combined and arranged in the manner and for the purpose herein specified.

60,566.—VENTILATING FAN FOR GAS BURNERS.—Henry Seher, St. Louis, Mo.

I claim a ventilating wheel, constructed, operated and applied in the manner shown and described, and for the purpose set forth.

60,567.—CHARGING SHELLS, ETC.—Tal. P. Shaffner, Louisville, Ky.

First, I claim the application of nitro-cotton (known as gun cotton), for the purpose of serving as a cushion and an explosive substance in shells, torpedoes, etc., wherein nitroleum (in chemistry known as nitro-glycerin), or other explosive liquid compounds is used as a charge, substantially as hereinbef re described.

Second, I claim the application of india-rubber as a cushion lining, for the purpose of lessening the concussion upon the nitroleum or other explosive liquid, substantially as hereinbefore described.

Third, I claim the honeycombing of india-rubber, with openings between the cells for the purpose of perfecting the cushion, and for the object of hastening the spread of fire throughout the said honeycomb cushion lining, substantially as hereinbefore described.

60,568.—METHOD OF GRADUATING VESSELS.—Tal. P. Shaffner, Louisville, Ky.

I claim, irrespective of size, form, or material, the bottle graduated substantially as described and represented.

60,569.—ELECTRIC FUSE.—Tal. P. Shaffner, Louisville, Ky.

I claim, First, The uze head, a, or d, with its chambers, be, one or both, as and for the purpose or purposes described.

Second, The indented or flanged cylinder, J j', with its cap, k, and head, d, for the direction of the flame of the fuze as described.

Third, I claim the mode of attaching the ires to the fuze head, by means of a non-conducting cement, inserted into a chamber in said head, or in the cylinder in immediate connection therewith as described.

Fourth, I claim the protecting water-proof membrane, or cover, n, for closing the mouth of the composition chamber, b.

Fifth, I claim the water-proof lining to the composition chamber, b, to prevent access of moisture to the said composition.

60,570.—HYDRAULIC PRESS TO PREVENT CORROSION.—Tal. P. Shaffner, Louisville, Ky.

I claim a non-corrosive lining to the chamber of a hydraulic or other press, and to the piston or that end of it presented to the said chamber; and this I claim whether the said parts consist wholly of material capable of withstanding the action of acids, or whether only such parts are thus protected as are exposed to the said action.

60,571.—MANUFACTURE OF GUN COTTON.—Tal. P. Shaffner, Louisville, Ky.

I claim the process of making nitro-cotton, commonly called gun cotton, or other nitro-fiber, under pressure.

60,572.—ARTILLERY AND MINING BLASTING.—Tal. P. Shaffner, Louisville, Ky.

I claim the combination of blasts to be discharged simultaneously by electricity, in such manner as will effect a conjunctive force of the respective charges, thereby increasing in disruption of matter beyond what can be obtained by separately discharging the said blasts.

60,573.—METHOD OF BLASTING WITH NITROLEUM.—Tal. P. Shaffner, Louisville, Ky.

First, I claim the combination of nitroleum with sand, for the purpose of blasting and distributing the explosive force throughout the drill hole or space where the same are employed, in the manner and for the purposes described.

Second, I claim for blasting purposes the use and interposition of a column of water between the "tamping" and "blasting" charges, when the same are arranged in the manner and for the purposes described.

Third, I claim as a method of blasting in rock the adjustment and arrangement of the "tamping" and "blasting" charges in such manner that the former shall be placed at or near the surface or upper part of the drill hole, while the latter is located at the bottom thereof or in such a manner as that the gases of the two charges may be united disrupting the rock, in the manner and for the purposes hereinbefore described.

60,574.—HAME FASTENING.—M. R. Shalters and T. Catern, Alliance, Ohio, assignors to themselves, Samuel Ray and S. Thomas.

I claim, First, The bar, A, provided with hooks as seen at each end and with the hook, B, secured to and operating with it, as and for the purpose set forth.

Second, The bar, C, with links formed in it and used in connection with the bar, A, constructed as and for the purpose set forth,

60,575.—PROCESS FOR RENDERING AND BLEACHING TALLOW, LARD, ETC.—John S. Shapter, New York City.

I claim the bleaching of tallow and other fatty matters by subjecting them to the action of alkaline lye while heated in vacuo, substantially as herein specified.

60,576.—FENCE.—W. B. Shelton, Congruity, Pa.

I claim, First, The combination of the posts, A, strip, A', boards, B, and clamps, C, constructed and arranged substantially in the manner and for the purpose set forth.

Second, The mode of forming the corners by means of the post, A, strip, A', boards, B, and clamps, D, respectively constructed substantially as set forth.

60,577.—LAMP SHADE.—Allen Shepard, Ashland, Mass.

I claim the combination of the support, B, and cap, C, with the corrugated shade, A, when said parts are arranged to operate as set forth.

Second, As a new article of manufacture, I claim the corrugated shade, A, provided with the support, B, and cap, C, as shown and described.

60,578.—WELL TUBING.—N. H. Sherburne, Elgin, Ill., and J. T. Whipple, Chicago, Ill.

We claim the combination of cylinder, B, pipe, A, screen, m, and disk, L, the whole constructed, arranged, and operated substantially in the manner and for the purpose described.

60,579.—BELT FASTENING.—S. J. Sherman, Brooklyn, N. Y.

I claim the arrangement of the hooks, A, on the adjustable fastening, C E D, and adapted for use on belts and waist bands, substantially in the manner and for the purpose herein set forth.

60,580.—ATOMIZING TUBE.—Asahel M. Shurtleff, Boston, Mass., assignor to himself, Benj. S. Codman, and F. O. Whitney.

I claim combining with the atomizing tubes, operating as described, an adjustable plug, or its equivalent, placed in or connected with the tube, b, substantially as set forth.

60,581.—HANGER FOR STOVE HOOKS, ETC.—Joseph Sigourney, Azel T. Robinson, and James Shepard (assignors to J. Sigourney, Azel T. Robinson, and B. B. Lewis), Bristol, Conn.

We claim, First, The band, F, with the swayed groove, B, when applied to a stovepipe, in the manner and for the purposes described.

Second, In combination with the foregoing, we claim the cast-metal hook or hanger, the whole constructed and used as set forth.

60,582.—SHOULDER BRACE.—Alonzo N. Smith, Hallowell, Me.

I claim the combination of the back pieces, B B, made with the spaces, the elastic cross pieces, b, attached as specified, tags, A A, and lacings, a, arranged and operating as and for the purposes set forth.

30,583.—ARTIFICIAL TEETH.—Francis W. Smith, Philadelphia, Pa.

I claim the use of flanged-headed plates, constructed substantially as described out of strips drawn from platinum wire, for confining artificial teeth to vulcanized gum or other plates, as above specified and shown.

60,584.—BLIND FASTENER.—G. Truman Smith and William E. Sparks, New Haven, Conn.

We claim the combination of the latch, A, provided with the lever, B, with the latch, C, when constructed and arranged so as to operate in the manner and for the purpose specified.

60,585.—REFINING HYDROCARBON.—Hamilton L. Smith, Gambier, Ohio.

I claim the charcoal filterer, G, in combination with the receiver, D, fan, A, heater, C, coiled pipe, B, arranged and operating as and for the purpose set forth.

60,586.—PUMP FOR DEEP WELLS.—William B. Snow, Titusville, Pa.

I claim the grooved metallic packing section or sections, B, secured in the tubing of an artesian well, in combination with an elongated piston, C, working through the same, the range of which is above and below said packing section or sections, they being of less interior diameter than the tubing, arranged substantially in the manner and for the purposes herein set forth.

60,587.—BOOTS AND SHOES.—Horace P. Stewart, Oak's Corner, N. Y.

I claim forming the heels of boots and shoes by the alternate, or nearly so, arrangement of welts and taps so as to build up the right shape without paring away the material to any considerable extent, substantially as herein specified.

60,588.—MANUFACTURE OF BOOTS AND SHOES.—Horace P. Stewart, Oak's Corner, N. Y.

I claim the instrument as described for shaping the heel welts, having its supporting arm, B, of the upper die swing on the base, A, which bears the other die substantially as and for the purpose herein specified.

60,589.—COMBINED GANG PLOW AND CULTIVATOR.—Wm. W. St. John, St. Louis, Mo. Antedated Dec. 2, 1866.

I claim, First, The combination of the frame, A C C D D', with the beams, M' and F, the draft plows and either the cultivator plows, F', and their attachments or the gang plows, M4, and their attachments, substantially as described.

Second, The combination of the wheel stands, B', with the frame, A C C D D', in such manner as to admit of lateral regulatory movements, substantially as and for the purpose set forth.

Third, The combination and arrangement of the levers, M3, with the beams, M', and chord or chain, M4, substantially as set forth.

Fourth, The employment of the guiding bars, M2, when constructed and used as and for the purpose set forth.

Fifth, The attachment of the draught rod, M, for the plow beams, M', to the pole, P, substantially as described.

60,590.—STUFFING AND VARNISHING WOOD.—H. R. Stone and E. N. Schultz, Greenwich, N. Y.

We claim the compound which we have above described to be applied either to oil finish or varnish finish, and to be used for the purpose of filling or stuffing the pores or interstices of all kinds of porous woods, thus making a perfect enamelled surface impenetrable to air or water, and which cannot be injured by either.

60,591.—COMPOUND FOR THE CURE OF DISEASES IN HOGS.—D. W. Stow, Thornton, Ind.

I claim the compound herein described in combination with the operation described as a remedy for the cholera, etc., in hogs, substantially as set forth.

60,592.—BREECH-LOADING FIRE-ARM.—Thomas L. Sturtevant, Boston, Mass.

First, I claim, in combination with the hammer, trigger, guard lever and the barrel applied to the stock and so as to operate with a stationary breech, c, as described, mechanism substantially as hereinbefore specified, whereby by one movement of the trigger guard lever the barrel may be caused to be raised to receive a cartridge, the hammer be set at half or full cock, and the spent cartridge shall be expelled from the barrel.

Second, I also claim the combination and arrangement of the main and auxiliary hammers and a screw, whereby the main hammer may be either caused to actuate the auxiliary hammers or be thrown out of action therewith as occasion may require and for the purpose hereinbefore explained.

Third, I also claim the construction of each of the grooves, d, with its rear end open, when such groove is combined with the barrel and the trigger guard lever, and is to operate therewith as and for the purpose described.

60,593.—FILTER FOR PETROLEUM.—George W. Sylvester, Newark, N. J.

I claim, First, A petroleum filter so arranged as to keep the crude oil in prolonged contact with the filtering material, and to admit of the clarified oil being off by a stop cock or its equivalent, substantially as herein set forth.

Second, Parallel diagrams or their equivalent serving to lengthen the pathway of the descending oil, substantially as herein arranged and for the purposes set forth.

Third, The introduction of a current of heated air into the bottom, so as to permeate and agitate the whole mass, and assist chemical action.

Fourth, The perforated screen, e f b g, with its radiating supports, used as in the manner described, and for the purposes set forth.

60,594.—RAILROAD SIGNAL LIGHTS.—Elisha H. Tobey, Watertown, N. Y.

First, I claim the combination with a revolving reflector box or other receptacle for a signal light of a signal or dial plate capable of being rotated in a plane at right angles to the plane in which the said box is revolved, as herein shown and described.

Second, In the apparatus herein described I claim the combination of the dial or signal plate with the gearing by which it is revolved under such an arrangement that the raising or lowering of the said plate in the signal frame shall cause it to be thrown in or out of gear, substantially as shown and set forth.

Third, In combination with the main signal frame I claim a reflector box or other receptacle for the signal light, under such an arrangement that the said box while sliding vertically in said frame shall also be capable of being rotated in a horizontal plane, substantially as shown and described.

Fourth, In the herein described apparatus I claim the combination with the reflector box and revolving dial plate, whose axes of rotation are at right angles with each other of the gear, mechanism by which the said box and plate are respectively revolved, arranged for operation, substantially as shown and set forth.

60,595.—DRILL FOR ROCKS, WELLS, ETC.—R. S. Torrey, Bangor, Me.

First, I claim the self-operating reversible ratchet, J, so constructed that it will reverse its motion with the same stroke, and will give the desired motion to the drill at every vibration of walking beam, B, for drilling purposes in combination with friction roller and spring, I.

Second, I claim the dog or hand, K, connecting, P, Fig.'s 1 2 and 7, adjustable slide, N, Fig.'s 1 and 2, nut, 3, sleeve, 2, Fig. 6, which is attached to center post, A, Fig. 1, in combination with the circular slanted plate for regulating the stroke of dog or hand, K, Fig. 1, to each stroke of walking beam, B, in the manner and for the purpose substantially as described.

Third, I claim the reversible shaft, H and H, Fig. 3, in combination with gear, H, and pinion, 1, Fig.'s 1, 2, and 3, the whole operating in the manner and for the purpose set forth.

60,596.—SHOE PEG FLOAT.—G. G. Townsend, Rochester, N. Y.

I claim, First, The employment or use of the auxiliary or detachable float plate, F, substantially as and for the purposes shown and described.

Second, Connecting the said plate, F, to the head, H, by means of the lugs, f, and one or more keys, e, substantially in the manner shown and described.

Third, The arrangement of the spring locking latch or lever, C, in combination with the pivoted head, H, substantially as shown and described and for the purposes set forth.

60,597.—INDIA-RUBBER COVERED UMBRELLA.—James H. Walker, Bergen, N. J.

I claim the India-rubber umbrella-covering formed in the manner specified as a new article of manufacture.

60,598.—GAS-HEATING PARLOR STOVES.—William S. Walker, Alexandria, Pa.

I claim the detachable top, A B, for a stove, the said top consisting of the oven, B', the valve, b2, the two hot air chambers or flue spaces, a2 a2, and the recesses, a' a', in the outside plates for receiving within them the faces of the smoothing irons as described, the said parts being constructed, arranged and combined together as and for the purposes described.

60,599.—TRACE FASTENING.—John R. Watkins, Baltimore, Md.

I claim the use of a barrel with slot and spiral spring and pin with catch thereon, making a secure and ornamental fastening for a trace to the end of the singletree.

60,600.—HOOKS AND EYES.—Israel Weinberg, Philadelphia, Pa.

I claim the construction of the eye having curved forked ends, E, for the purpose of regulating, tightening, or loosening the waistbands of pantaloons, so as to correspond with the shape of the body and suit the wearer, as herein described.

60,601.—OPEN FIRE PLACES.—Marshall D. Wellman, Pittsburg, Pa.

I claim the use of a damper or dampers, so constructed and arranged relatively to the grate bars of a fire place or other furnace as that the area of the opening between the bars for the admission of air into the fire shall be increased or diminished by the operation of the damper or dampers, substantially as hereinbefore described.

Second, The use of a reflector or reflectors placed in front of and within the fire chamber of an open fire place, substantially as and for the purpose herein before set forth.

60,602.—COOKING STOVE.—Marshall D. Wellman, Pittsburg, Pa.

I claim the use, in cooking stoves, ranges, and other furnace grates, of dampers, slides, or shutters, in combination with a close fire chamber, so constructed and arranged, substantially as hereinbefore described, as that the air may be admitted below the surface of the fuel to a particular part or portion entering of the fire chamber, while it is excluded from entering the fire chamber at other points.

60,603.—MILK CAN.—Rollin C. Wickham, Pawlet, Vt.

I claim the construction and arrangement of milk cans with reference to the supporting bottom and ears, as herein described, to be operated in the manner and for the purpose set forth.

60,604.—CORN PLANTER.—Albert Windeck and Andrew Runsteller, Peoria, Ill.

We claim, First, In a seeding machine the oscillating semi-cylindrical bottom, C, in combination with the casing, B, when arranged substantially in the manner and for the purpose set forth.

Second, The combination of the dropper, c, lever, J, and valves, K and L, in the runner shank, constructed substantially as and for the purpose set forth.

Third, In combination with the valve crank and lever, J, we claim the box I, when said several parts are constructed and arranged as set forth.

Fourth, The combination of the oscillating dropper, C, arm, N, and handle M, when arranged substantially as set forth.

Fifth, The combination of the treadle, G, hinged roller, F, and runner, P hinged to the frame at e, substantially as and for the purpose set forth.

Sixth, The runner, P, and its shank, D, when constructed as set forth.

Seventh, In combination with the droppers, C, the adjustable slide, c, when constructed and arranged substantially as set forth.

Eighth, In combination with the dropper casing, B, we claim the cotton dropper constructed and operated substantially as described.

60,605.—PUMP.—E. B. Winship, Racine, Wis.

I claim the combination and arrangement of depressions, 1 2 3 4 5 6 7 8, flange, W, loose packing, B, ribs, D, and openings, F, substantially as set forth and described.

60,606.—WHIP.—Edmund F. Woodbury (assignor to himself and H. A. Strong), Rochester, N. Y.

First, I claim a whip, having the handle or any other portion covered with a knit fabric, substantially as herein described.

Second, I claim covering the handle or any other portion of a whip by drawing on the same a piece of tubular knit fabric, and fastening it thereon in any suitable manner, substantially as and for the purpose herein described.

60,607.—BREECH-LOADING FIRE-ARM.—Theodore Yates, Milwaukee, Wis.

First, I claim the construction of the breech, C, having the rectangular opening with the overhanging shoulder at the top, and having the wall or shoulder, m, for the breech block to rest against, substantially as described.

Second, In combination with the breech, C, I claim the block, D, having its upper arm pivoted on a line with the upper surface of the bore, and its lower arm abutting against the shoulder, m, in line with the lower surface of the bore, with its upper front corner beveled as shown, said block being arranged to operate as herein set forth.

60,608.—CARRIAGE-CURTAIN EYELET.—C. W. Acker, Watertown, N. Y.

I claim the toothed struck-up plate, C, and notched struck-up plate, D, in combination with the slitted elastic plate, E, constructed and applied substantially as described for the purpose specified.

60,609.—ELLIPSOGRAPHS.—H. M. Albee, Webster, Mass.

I claim the arm, D, with its adjustable point, c, in combination with the compass, A, constructed and operating substantially as and for the purpose described.

60,610.—ANVIL FOR SWEDGING CALKS FOR HORSE SHOES.—Peter Badore, Montpelier, Vt.

I claim the swedge, A, for drawing the steel from which the toe calks are to be formed, to an edge, when said swedge is constructed substantially in the form herein shown and described.

60,611.—STEAM GENERATOR.—Robert Bailey, Idaho City.

First, I claim a sectional steam boiler divided into four principal parts, two central sections, B' B', and two external jackets, B B, constructed, combined, and arranged as herein described.

Second, I claim the combination of the hollow grate bars with the central sections, B' B', and the jackets, B B, arranged and connected as herein described.

Third, I claim the damper, k, for giving direct or indirect draught through the boiler, in combination with the fire spaces, D and e e', and the exit flue, F arranged and operating as and for the purpose herein described.

60,612.—WASHING MACHINE.—James Ballard, Almont, Mich.

I claim the reciprocating rubber, B, having the hand lever, C, connected to it through the medium of the hinged bar, E, with elastic cord, D, or equivalent attached, substantially in the manner as and for the purpose herein set forth.

60,613.—SLEIGH BELL.—Abner G. Bevin, Chatham, Conn.

I claim the sharp-edged lugs, a, extending from the sides of the shank, A, and resting on the head of the rivet, to the other end of which the bell is secured and adapted to cut into the leather and prevent the turning of the rivet, as and for the purpose specified.

60,614.—TACKLE BLOCK.—John Briggs, Louisville, Ky., assignor to himself and E. A. Holmes, Passaic, N. J.

I claim the combination and arrangement of the sheave pin, C, sheave, B, collar, D, pin, G, bushing, F, hook, E, pins, e e, and cheeks, A A, when all are constructed as herein shown and described.

60,615.—BROOM HEAD.—Willard P. Brooks (assignor to himself and F. B. Crippen), Fairmount, Minn.

I claim the combination of the metallic point or piece, B, the rod, C, bolts, D, or equivalent, and the wires, I, with each other, and with the handle, A, and socket, E F, when said point, rod, bolts, and wires are constructed and arranged substantially as herein described and for the purposes set forth.

60,616.—SELF-OILING AND ADJUSTING BEARING FOR MACHINERY.—Thomas S. Brown (assignor to himself and John P. Adriance), Poughkeepse, N. Y.

I claim the combination of the bed, A, part, B, with its bearing surfaces, as described, and lip, h, slotted shell, c, cast with part, B, forming the oil chamber, a, the grooved part, E, slotted caps, F, and semi-spherical washers, H, arranged with the journal, C, provided with the ring, D, substantially as and for the purpose specified.

60,617.—ANVIL ON WHICH TO RIVET TRUNKS.—Walter D. Burnett, Newark, N. J.

I claim the adjustable rotating block, C, secured to a frame, A, and arranged with pins, c, or other equivalent stops, substantially as and for the purpose set forth.

I further claim the connecting of the pins with springs and a treadle, to operate in the manner substantially as and for the purpose specified.

60,618.—POTATO DIGGER.—Chas. B. Cannon, Keokuk, Iowa.

I claim the improved potato digger, consisting of the fluted wheels, n3 n4 the prongs, U, the carrier, W, and screens, V, the various parts of which are constructed, arranged, and operated substantially as herein described and for the purpose set forth.

60,619.—SAW SET.—John Clarridge, Pancoastburg, Ohio.

I claim an improved saw set formed by the combination of the cylinder, B, cones, g and L, scales, J and O, index pins, K and P, set screws, E F I N and R, with each other, and with the frame, A, substantially as herein described and for the purposes set forth.

60,620.—SUGAR-CANE PLANTER.—Eusebio Cortes, Sagua la Grande, Cuba, assignor to Jose A. Mora, New York City.

First, I claim the cane planter, consisting of the wire box, C, plow, D, plows, I, hopper, J, inclined chute, K, handle, H, and adjustable wheels, A E, substantially as and for the purpose specified.

Second, I also claim the lever, F, and wheel, E, in combination with the frame, A, and plow, D when constructed and applied as herein shown and described.

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60,621.—SAWING MACHINE.—T. H. Cushing, Dover, N. H.

First, I claim the combination of recip ocating saws, J, with rotary planers, W W, arranged with a carriage or bed, K, placed on curved ways or guides, b, for the purpose of sawing and planing sticks in curved form simultaneously or at one operation, substantially as shown and described.

Second, The friction roller, R, attached to the pendent swinging frame, S, which is connected to the lever, T, as shown in connection with the two shafts, O P, provided with the gears, c d, the belt, h, and the adjustable bearing, a*, of the shaft, P, arranged with lever, T, to operate substantially as and for the purpose specified.

Third, The taper blocks, U U, when used in connection with a carriage or bed, K, working on curved ways or guides, b, and reciprocating saws, J, substantially as and for the purpose set forth.

60,622.—STEAM TRAP.—T. N. Davey, Jeffersonville, Ind.

First, I claim the stem or upper portion, A, and the case, B, when combined with the faucet barrel, cam, or key, H, and the arm or handle, J, constructed substantially as described.

Second, I claim the cam, H, when used in connection with the adjustable spring seat, G, and spring, E, substantially as herein shown and described.

60,623.—TRELLIS FOR GRAPE-VINES.—B. F. Elliott, Cedar Rapids, Iowa.

I claim the combination with the hinged uprights, A, of the wedge pieces, E, and staples, F, substantially as and for the purpose described.

I also claim the rails, G, hung to the uprights, A, so as to turn or swing thereon, substantially as and for the purpose specified.

60,624.—METAL LOOP FOR TAGS.—Samuel B. Fay, Franklin, Pa.

I claim the hook for tags consisting of the loop wire, A, with both ends turned or bent into circles, adapted to lay side by side and applied to the tag in the manner described for the purpose specified.

60,625.—COTTON CULTIVATOR.—A. K. and B. H. Foster, Hallettsville, Texas.

First, We claim the share, D, composed of two parts, d d, arranged in V-form with a space, e, between their front ends and attached to a standard, F, and to the front ends of the handles, B B, in the manner shown and described, or in an equivalent way, to admit of being adjusted at a greater or less distance apart at their front ends, substantially as shown and described.

Second, The reciprocating cutter, L, operated from the wheel, D, through the medium of the screws, i, and the rock bar, I, provided with the arms, p p', in combination with the share, E, substantially as and for the purpose specified

Third, The fitting or securing of the screws, i, to the wheel, D, by means of the concentric annular grooves, c c', in the side of the said rim, b, of said wheel to receive the nuts, a, of the screws, i, whereby the screws may be readily applied to and detached from the wheel and secured at an equal distance apart, substantially as described.

60,626.—PREPARATION OF PAPER ETC., FOR PHOTOGRAPHIC USE.—William Gibson, New York City.

I claim the production of an insoluble enamel or surface or size in or upon paper, silk, cloth, fibrous and textile articles of all kinds, wood, leather, glass, porcelain, earthenware, metals, india-rubber, gutta-percha, *papier mache*, passe-partout and compositions by the successive application thereto of an adhesive mixture or body and astringent mixture or solution, substantially as described.

60,627.—CLOTHES PIN.—T. L. Goble, Orange, N. Y.

I claim a clothes pin consisting of two jaws, A, pivoted or hinged together, in combination with the shackle, B, arranged to slide upon the said jaws, substantially as and for the purpose described.

60,628.—SAWING MACHINE.—Edwin Hard, Canal Dover, Ohio.

I claim operating the saw carriage by means of the bevel pulleys, Y Z, clutch, A', lever, B', curved lever, G', adjusting bar, D', and gage rod, E', arranged and operating substantially as described for the purpose specified.

60,629.—STEAM-ENGINE GOVERNOR.—A. A. Henderson, Naval Hospital, near Norfolk. Va.

I claim the shaft, B, the sleeve, C, the eccentric plates, D and E, and cam, E', and shaft, G, with its lug wheel, H, and ratchet, I, the arm, J, and the spring, S, and the eccentric rod, C', with its guide pins, e and e', when constructed, arranged, and combined substantially as herein described for the purpose specified.

60,630.—SOLAR TIME INDICATOR.—James Higgins, East Cambridge, Mass.

I claim the combination of the ring, A, having slots, a and c, in it with the ring, B, provided with the scales, D D', and set screw, C, the same constructing a solar time indicator, substantially as herein shown and described.

60,631.—MALT EXTRACTOR.—Leopold Hoff, New York City.

First, I claim the within-described process of malting by soaking the barley with a decoction of fennel, instead of plain water, as set forth.

Second, The beer of health, obtained by mixing the wort obtained by the above-named process with the hygienic ingredients, as herein set forth.

60,632.—HYDRAULIC GOVERNOR.—S. M. Hunter, Terryville, Conn.

First, I claim regulating the speed of a water wheel or a steam engine by the action of an engine driven by water or other non-elastic fluid, in the manner herein set forth.

Second, I also claim the oscillating valve, T, constructed substantially as described, in combination with the non-elastic fluid engine.

90,633.—SASH FASTENER.—Benjamin S. Hyers, Pekin, Ill.

I claim the catch, E, operating within the toothed roller, A, in combination with the plate, F, inclined tooth back, C, and toothed roller, A, substantially as herein shown and described and for the purpose specified.

60,634.—FIFTH WHEEL.—Joseph Irving, New York City.

I claim the safety clip, E, consisting of the part, c, with the semi-circular recess and the recessed part, d, between which the fifth wheel plays in the recesses, having a yielding pressure, and secured and operating in the manner and for the purpose specified.

60,635.—MANUFACTURE OF WATER AND FIRE-PROOF PAPER.—Thomas Irving, John McNeil, George W. Rich, and Cyrus J. Tay, Elwood, N. J.

First, I claim water-proof paper, prepared as herein described, as a new article of manufacture.

Second, The within-described process of manufacturing water-proof paper by treating manilla, or hemp, or other fibrous material, with the ingredients and in the manner set forth.

60,636.—APPARATUS FOR SCRAPING HIDES.—Henry Lampert, Nunda, N. Y.

First, I claim the revolving beam, A, mounted on the vertically adjustable shaft, B, in combination with the block, g, carrying the scraper, e, and knife, f, and with suitable mechanism to impart to said worker a reciprocating motion, substantially as and for the purpose described.

Second, The eccentric, b, lever, a, and serrated arc, d, in combination with the cleats, c, shafts, B, and beam, A, constructed and operating substantially as and for the purpose set forth.

Third, The worker, composed of a block, g, with scraper, e, and knife, f, in combination with the spring, h, pitman, G, cross head, F, and eccentric wrist pin, n, on the disk, H, constructed and operating substantially as and for the purpose described.

Fourth, The screw rod, j, and nut, k, in combination with the worker, g e f, spring, h, and pitman, G, constructed and operating substantially as and for the purpose set forth.

60,637.—SPRINKLING ATTACHMENT FOR BROOMS.—Peter Louis, New York City.

I claim the within-described sprinkling attachment for brooms, composed of reservoir, A, provided with a socket, a, a number of holes, b, in its bottom, and with a vent hole, c, in its top, for the purpose herein set forth and described.

60,638.—ROTARY STEAM VALVE.—James L. Mackey, Seymour, Ind.

First, I claim the valve, A, with a V-shaped partition, B, and apertures, c d a a' b, in combination with the sleeve, C, and shell, D, constructed and operating substantially as and for the purpose described.

Second, The transverse channel, m, in combination with the hollow plug valve, A, V-shaped partition, B, and with aperture, j j' k k' l l' c d, substantially as and for the purpose set forth.

60,639.—TIGHTENING THE TIRES OF WHEELS.—F. B. Morse, Milwaukee, Wis.

First, I claim the lips, e e, at the ends of the tire, C, in combination with the keys, D D E, operated through the medium of screws and one or more removable or adjustable keys, F, all arranged substantially as and for the purpose set forth.

Second, The arms, f f, on the lips, e, in combination with the keys, E D D, substantially as and for the purpose specified.

Third, The socket, B, provided with the partitions, a a, to form two end partitions to receive the ends of the fellies, and a central compartment to receive the tire-tightening mechanism, substantially as and for the purpose specified.

60,640.—LIFE RAFT.—James Murtaugh, New York City.

I claim the expansible rings, a a, separate and arranged one within the other, with a net-work covering, forming a seating surface and a rest or hold for the feet, in the manner described for the purposes specified.

60,641.—EXTENSION WEEDING HOE.—Mitchell Pentz, Naugatuck, Conn.

First, I claim forming the head of the hoe in two parts, substantially as herein shown and described, so that they may overlap and slide upon each other, as and for the purpose set forth.

Second, Forming ways upon the parts, A and B, of the hoe head, to keep them in proper relative position upon each other while sliding back and forth, substantially as herein shown and described.

Third Forming slots in the parts, A and B, of the hoe head, for the reception of the handle, substantially as herein shown and described.

60,642.—TERRASPHERE.—Eleazar Root, Indianapolis, Ind.

First, I claim the stand, A, and the pillar, B, combined with the vertical dial plate, C, the horizontal spindle, D, carrying the sun, G, and the frame, H H, carrying the earth, K, revolving on its own axis, f f, in the suspended vernier, g, and while revolving vertically around the sun, G, with the frame, H H, keeping its true angle of inclination to the ecliptic throughout her orbit arranged and operating substantially in the manner and for the purpose, herein described and specified.

Second, I claim the zodiacal belt, I, in combination with the pillar, B, the dial plate, C, the frame, H H, the sun, G, and the earth, K, arranged and applied, substantially as and for the purposes herein described.

Third, I claim the adjustable moon, N, in combination with the earth, K, and its axis, f f, and applied substantially as and for the purposes herein set forth.

Fourth, I claim the radiating points, c c, representing the ways of the sun in combination with the spindle, D, the sun, G, and the earth, K, and applied substantially as and for the purposes herein described.

Fifth, I claim the hemispherical night cap, M, in combination with the earth, K, axis, f f, and the sun, G, and applied substantially as and for the purposes herein described and represented.

60,643.—CORN STALK CUTTER AND CORN HUSKER.—Jacob Russell, Brooklyn, N. Y.

First, I claim the construction of rollers, C C', of circular cutters, f f, and longitudinal cutters, h h, these latter intersecting the cutters, f, so as to cut the stalks of corn crosswise at the same time that they are split longitudinally and at the same time crowd the ears of corn back, substantially as described.

Second, The husking bed consisting of non-elastic rollers arranged in an inclined plane and rotated substantially as described in combination with knives on rotary cylinders, which allow the stalks to pass between them, but crowd the ears of corn back upon the bed, substantially as set forth.

Third, The inclined bridge, G, interposed between the roller, C', and the husking bed, substantially as and for the purpose described.

Fourth, The yielding gate, J, arranged over the inclined husking bed so as to operate substantially as described.

Fifth, A machine which is adapted for cutting up corn stalks, stripping the ears of corn from the stalks, and then separating the husks from the ears, substantially as described.

60,644.—GATE AND DOOR LATCH.—B. D. Shaw, Beverly, Ohio.

I claim the combination of the catches, D D, and pivoted lever, E, constructed so as to operate substantially as herein shown and described.

60,645.—RAG ENGINES FOR PAPER MAKING.—James M. Shew, Piper Mills, Md.

I claim placing a spiral scroll or voluted flange on the ends of the cutting cylinder of a rag engine of a paper mill, substantially as and for the purposes herein described.

60,646.—ADJUSTABLE MITER.—Peter A. Snyder, Jersey City, N. J.

I claim the arrangement with the pivoted blades, a b, leaves, c d, and flat stock, A, of the screw, e, nut, h, and groove, f, when the plates are constructed as to admit of the ready adjustment of the pivoted blades, a b, and leaves, c d, when said stock is resting on a flat surface as herein set forth.

60,647.—WOOD TURNING LATHES.—Mathias Speule, Detroit, Mich.

First, I claim the arrangement of two clamps which are coupled together, one to contain the pattern last and the other the last to be finished in combination with the guide wheel, F, and cutter wheel, G, constructed and operating substantially as and for the purpose described.

The swinging head, B, and adjustable platform, C, carrying the clamps, D D', in combination with the guide wheel and the cutter wheel, substantially as and for the purpose set forth.

60,648.—SAW MILL.—E. H. Stearns, Erie, Pa.

First, I claim relieving the saw from friction of the log while resting on the carriage, B, by means of the flat wheels, a, grooved wheels, a', axles, c, and boxes, a'', flat track, b, and angular track, b', constructed and operating substantially as described for the purpose specified.

Second, I claim constructing a cant support joined to and forming an inseparable part of the saw guide in such a manner that when the guide is moved nearer or farther from the saw arbor when changing saws, the cant support will necessarily move with it, arranged and operating substantially as and for the purpose herein specified

Third, I claim giving motion to the log carriage and reversing the same by means of friction pulleys, l and l', when caused to bear upon the pulley, m, and when rigidly fixed to shafts, f f, each having a continuous and positive revolving motion from bolts applied to pulleys, i i', all constructed and operating substantially as described.

60,649.—SAWING MACHINE.—Washington H. Stewart, Logansport, Ind.

I claim the brace, E', provided with a ratchet in combination with the pawl, G, saw bar, H, pitman, J, and crank wheel, L, for the purposes and substantially as described.

60,650.—FORK AND CAKE LIFTER.—P. D. Sunnie, Shirleysburg, Pa.

I claim an improved culinary instrument formed by combining the fork, B, and the flat blade, C, in one piece pivoted at one end of the handle, A, and held in place when reversed for the use of either the fork or the blade by the yoke, c, under pressure of the spiral spring, g, arranged and operating as described.

60,651.—SHEEP RACK.—Byron D. Talor, Wilson, N. Y.

I claim an improved sheep rack formed by the combination of the end pieces or frames, A B, the binders, c, the sides, D, of the hay rack, the revolving troughs, F, levers, E, and revolving covers, G H, with each other, the parts being constructed and arranged substantially as herein shown and described and for the purposes set forth.

60,652.—DOUGH MIXER.—S. J. Talbott, Milford, N. H.

I claim an oscillating dough mixer consisting of the can, A, double metallic cover, B, hoop, D, trunnions, E, handle, F, hooks, G H, and frame, C, constructed and operating in the manner as and for the purpose specified.

60,653.—TOOL FOR CLEANING BOILER TUBES.—Sidney Van Auken, Binghamton, N. Y.

I claim the doubly yielding spring arms, B, in combination with the segmental scrapers, C, and cams, a b, constructed and operating substantially as and for the purpose set forth.

60,654.—REVERBERATORY FURNACE.—J. M. Whiteside, San Francisco, Cal.

First, I claim the arrangement of a revolving stirrer, in combination with the oven, A, constructed and operating substantially as and for the purpose described.

Second, The protecting cap, b, in combination with shaft, c, which gives motion to the stirrers substantially as and for the purposes set forth.

Third, The arrangement of the supply tank, E, and stop-cock, i, which is operated automatically from the driving shaft, C', in combination with the generator, h, tube or tubes, g, and oven, A, constructed and operating substantially as and for the purpose described.

60,655.—COMBINED ROLLER AND HARROW.—George H. Woodruff, Jerseyville, Ill.

First, I claim the employment of the pivoted lever, O, for the purpose of elevating the harrow, so that only the rollers may be used substantially as shown and described, and for the purpose set forth.

Second, The wheels, B B, in combination with the rollers, C C, and frame, A, constructed and arranged in such a manner that the rollers may be removed, and only the wheels used, or the wheels removed, and the rollers moved out to the frame, substantially as herein shown and described, and for the purpose set forth.

Third, I also claim the beams, G G', standing obliquely to the frame, A, when the said frame, A, is provided with wheels, B B, and rollers, C C, constructed and operated substantially as and for the purposes set forth.

Fourth, The adjustable seat in combination with the frame, A, wheels, A A, and rollers, c c, and harrow, for the purpose of regulating the depth of the harrow teeth, e, substantially as described, and for the purpose set forth.

Fifth, Attaching the pole or tongue, E, by means of bifurcated bar, or straps, P, to near the center cross-piece, K, of the frame A, in combination with the guide, a 2, substantially as shown and described, and for the purpose set forth.

60,656.—MANUFACTURE OF BUTTER FROM WHEY.—James Suggett, Cortlandville, N. Y.

I claim the manufacturing of butter from whey, substantially in the manner herein described.

60,657.—CUSHION FOR BILLIARD TABLE.—Levi Decker, New York, N. Y.

I claim the cord, E, employed in combination with the elastic strip, D, and cushion, c, in the manner and for the purposes specified.

RE-ISSUES.

2,419.—KNITTING MACHINES.—Jonas B. Aiken, Franklin, N. H., assignee by mesne assignments of J. B. and W. Aiken. Patented July 8, 1856.

First, I claim the hollow circular needle plate, having grooves cut on its inner surface, substantially as described, for the objects specified.

Second, I claim the horizontal groove, c, near the bottom of the cone, so arranged in relation to the inclined operating groove that the needles may be retreated thereto, substantially as described, and retained therein when they are not wanted to operate on the fabric knit in the manner set forth.

Third, I claim the switch, g, arranged substantially as described, to change the needles from the inclined operating groove to the retreating groove.

Fourth, I claim the use of the two sets of sliding needles in rotary knitting-frames, called the plain series, and the rubbing series, arranged and operated substantially as set forth.

2,420.—LOCKS.—Richard B. Burchell, Brooklyn, N. Y. Patented September 11, 1866.

First, I claim the fixed tumbler stud, g, and key stud, l, arranged on the line of a plane passing through the center of the bolt-head in combination with tumblers of unequal shape and dimension, but so constructed that they can be applied on either side of the key stud, and be equally operative with a key of different shape or dimension, substantially as set forth.

Second, I claim constructing the head of the bolt as described, and arranged by a series of swinging tumblers to operate in conjunction therewith substantially as set forth.

Third, I claim the tumblers, h i k, constructed and applied substantially as specified, in combination with the key stud, l, and bolt head, c, constructed and arranged in the manner and for the purposes set forth.

2,421.—PORTABLE LAMP COOKING APPARATUS.—C. A. Harper, Rahway, N. J. Patented May 1, 1866.

First, I claim the heater, E, when attached to the bottom of the boiler, or its supporting plate, by cleats, on which it may be moved without disturbing the other parts of the apparatus, as and for the purpose set forth.

Second, The boiler, A, of a cooking stove, when constructed with a central vertical pipe, B, opening through it, and also with transverse pipes, E, across the same, as and for the purpose set forth.

Third, A cooking apparatus, when so constructed that there shall be a direct communication from the heater through the boiler into the chamber without the interposition of bottom plates to the latter.

Fourth, So arranging the boiler and oven that access may be had to the interior of the boiler through the doors of the oven, substantially as set forth.

Fifth, The oven, C, when so constructed that the heated air is introduced directly into the body of the oven, and its exit is controlled by the flue sheet L, and damper, O, arranged substantially as set forth.

2,422.—COMPOSITION OF MATTER FOR LUBRICATING MACHINERY AND FOR OTHER PURPOSES.—The Lester Oil Manufacturing Company, New York City, assignees of John H. Lester. Patented Jan. 30, 1866.

I claim the combination of oil with the synovial fluid or other substance obtained from animal matter, substantially as described.

2,423.—MACHINE FOR CUTTING SCREWS.—John A. Merriman Chicago, Ill. Patented Aug. 1, 1865.

First, I claim, in combination with a revolving die holder, two or more screw-cutting dies, provided with inclines and projections, arranged and operated substantially in the manner and for the purposes herein specified.

Second, In combination with a revolving die holder and two or more screw cutting dies, constructed substantially as described, I claim the arrangement of longitudinally-sliding bearings operating upon said dies, substantially in the manner and for the purposes set forth.

Third, In combination with longitudinally-sliding bearings, operating directly upon screw-cutting dies substantially as described, I claim the arrangement of a latch or stop for the purpose of retaining said dies in, or releasing them from the die holder at the will of the operator, substantially as herein specified.

Fourth, Closing the dies by the use of the bearings, K, upon the longitudinally-sliding cylinder acting directly upon the dies, substantially as and for the purpose herein specified.

Fifth, The sliding bearings, K, the levers, i, and the dies, g, arranged and operating substantially as and for the purposes herein specified.

2,424.—MACHINE FOR PICKING COTTON.—William E. Brall, Washington, D. C. Patented February 27, 1866.

First, I claim a machine for harvesting cotton, constructed and operating substantially as described.

Second, In a machine for harvesting cotton. I claim the revolving picking cylinder as a device for gathering the cotton among the branches of the plant, constructed and operating substantially as described.

Third, I claim in a cotton harvesting machine, the employment of one or more continuous series of said picking cylinders, so arranged as to be made to pass in close succession through the plant to gather the cotton as described and also to move progressively along the row of plants so as to operate on all parts thereof, substantially as described.

Fourth, I claim the combination and arrangement of a continuous series of picking cylinders projecting from the face of a wheel set at an angle to the line of progression of the machine or its equivalent, so that in their downward movement the picking cylinders shall pass outside of the plant then beneath its branches, and up through and among the same, substantially as described.

Fifth, I claim the combination with a series of revolving picking cylinders arranged upon a wheel or its equivalent as described, of a stationary band or other equivalent mechanism that will rotate said cylinders, substantially as described.

Sixth, I claim the combination of the wheel, E, and its series of picking cylinders or the series arranged in a manner equivalent thereto, with the carrying wheels, C, of the machine, so that the picking cylinders shall automatically and simultaneously receive therefrom a rotating movement as described, and an upward movement through the cotton plant, and a progressive movement along the row of plants, substantially as described.

Seventh, I claim in combination with the series of picking cylinders, arranged as described, the series of toothed arcs and the clearing wheel or their equivalents for removing the cotton from the cylinders, substantially as described.

Eighth, I claim the employment in combination of two systems of mechanism for gathering and discharging the cotton, constructed, arranged and operating substantially as described, and set diagonally face to face so as to operate simultaneously upon opposite sides of the plant, substantially in the manner described.

Ninth, I claim the trough or receptacle for the cotton placed above the cross connection of the machine and with the series of picking cylinders so as to receive the cotton as it is removed from the cylinders, substantially as described,

Tenth, I claim the manner of combining and arranging the wheels, E, with their adjuncts, the framing of the machine, the carrying wheels, and the tongue or perch, so as to leave an open space lengthwise through the machine below the cross connections; which enables the machine to pass over plants without bending them down so as to interfere materially with the cotton substantially as described.

Eleventh, I claim combining with the framing and operative parts of the machine, constructed and arranged as described a tongue or perch, to which animals may be harnessed in the manner before described, to draw the machine along, and maintain it in an erect position.

2,425.—HEATING STOVE.—Silas T. Savage, Albany, N. Y. Patented March 30, 1858.

I claim, in stoves or furnaces, a fire-box, with a grated back for the admission of the air which circulates through the ash pit, and the flue back of the grate, substantially as described.

2,426.—PUNCHING MACHINE.—J. Steadman, Pecatonica, Ill. Patented December 19, 1865.

First, I claim the socket, F, sliding through the opening, V, operating in combination with the link, G, pivoted to the right-angled lever at its inner end, whose outer end is pivoted to the connecting rod, J, operated by the adjustable right-angular lever, P, substantially as described.

Second, The combination and arrangement of the link, G, which drives the socket and punch, F E, with the right-angled lever, I H, working on the rock-shaft, R, when the connecting rod, J, arms, R N, working on the rock-shaft, L, and the link, O, and hand-lever, P, substantially as described.

2,427.—MACHINE FOR CUTTING STAVES.—W. Steele, Wheeling, Va. Patented October 19, 1858.

First, I claim the swinging-frame, composed of the pieces, c c, bed-plate, K, and knife, R, in combination with cross-tie, I, constructed and operated in the manner substantially as shown and described, and for the purpose set forth.

Second, The apron, M, hinged to the bed-plate, K, as described, or otherwise attached to the machine, in such a manner that it can be held under or back of the knife, to support the piece during the process of cutting, and then swing down or fall back to allow the piece to drop from the knife.

Third, The combination of the levers, L L, and stops, B and D, or their equivalents, as described.

2,428.—PAINT FOR THE BOTTOM OF SHIPS.—James Gamage Tarr, and Augustus H. Wonson, Gloucester, Mass. Patented June 20, 1865.

First, We claim the composition of paint consisting of oxide of copper, oxides of zinc, and oxide of arsenic, used with a basis of ochre, and a suitable medium substantially as described.

Second, The composition of paint consisting of the oxide of copper, and oxide of zinc, used with a basis of ochre, and a suitable medium, substantially as described.

Third, The composition of paint consisting of oxide of copper, and oxide of arsenic, and with a basis of ochre, and a suitable medium, substantially as described.

2,429.—HAY ELEVATORS.—Edward L. Walker, Benford's Store, Penn.

First, I claim the combination in a fork for elevating hay, or similar material, of the following devices: First, a shaft for penetrating such material; second, a barb or barbs, for sustaining the material while being elevated; and third, a device for relieving the barb or barbs for discharging the material, substantially as set forth.

Second, I claim a penetrator in combination with one or more sustaining prongs or barbs, and a discharging device substantially as specified, for raising or discharging hay, or similar material, substantially as set forth.

Third, I claim the barbs, E E, arranged substantially as specified, in combination with the rod, F, for subtaining said barbs as set forth.

DESIGNS.

2,530.—KNIFE HANDLE.—Henry H. Hayden, New York, N. Y., assignor to Holmes, Booth & Hayden, Waterbury, Conn.

2,531.—SPOON HANDLE.—Henry Hebbard, New York, N. Y.

2,532.—BALANCE.—Charles E. Hoffman, Philadelphia, Penn.

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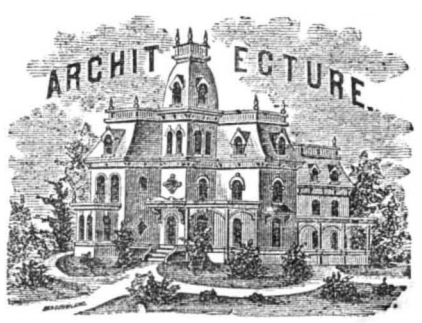

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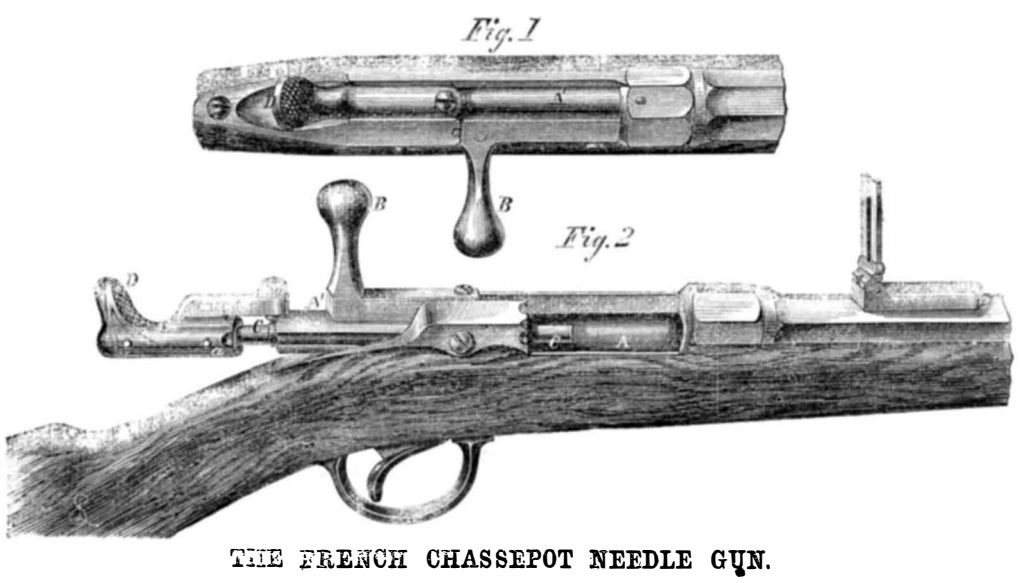
Improvement in Needle Guns.

The Emperor of France, not wishing to remain behind other nations in the possession of an effective fire-arm, has adopted the invention of M. Chassepot, of which Fig. 1 in our engraving shows the construction. This gun resembles the original Prussian needle gun, over which it possesses certain improvements.

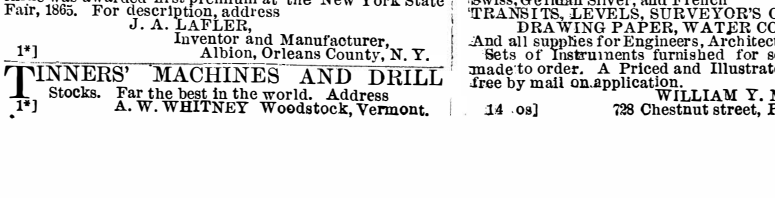
An opening on the right hand side of the chamber, A, permits the insertion of the cartridge. This chamber is filled by the movable cylinder, A′, which may be moved back or forward by means of the handle and knob, B. The cylinder, A′, surrounds the shaft, C, and can be revolved around the same. It contains the spring by which the needle is propelled. The rear end of the shaft, C, is made in the shape of a handle, D. The spring is compressed, when the handle, D, is drawn back as shown. The shoulder, *a*, on the shaft, C, comes in contact with the cylinder, A′, when the arm is at rest. When loaded and ready for firing, the two parts are drawn asunder. In the engraving the arm is shown in position to receive the cartridge. The shaft, C, also serves to protect the needle which is surrounded by the same and is forced out of the front end of the shaft as soon as the trigger is pulled.



THE FRENCH CHASSEPOT NEEDLE GUN.

After the cartridge has been inserted, the knob, B, is pressed forward, and is then laid over to the right hand side, as shown in Fig. 2. The aperture, A, is now closed. By the first of these two movements the cylinder, A′, is moved forward, thereby forcing the cartridge into the breech; the second movement secures the cylinder, so that it cannot be thrown back by the force of the explosion. The pulling the trigger releases the spiral spring, which then forces the needle through the percussion wafer. It is claimed that this gun cannot be clogged up as easily as the Prussian needle gun, and is more substantially built. But it is constructed on the same principle in almost every respect.

The Prussians, seeing that all nations are making rapid progress in the perfection of their arms, do not want to be behind them, and Mr. Dreyse, the inventor of their needle gun, is at work day and night, inventing and testing more powerful and destructive implements of war. The annexed sketch shows his latest improvements in the needle gun. The heavy wooden butt end is here superseded by one which is made altogether of metal, in the most practical form. The arm is thereby made about three lbs. lighter than it was formerly, and from two to three dollars cheaper. In this gun provision is made that the needle cannot be burnt, as it is instantaneously drawn back as soon as it has pierced the percussion wafer, thus not coming in contact with the fire, which it has to set free. Mr. Dreyse is also experimenting on a new breech-loading needle cannon, in which two barrels are arranged alongside of each other, which can be managed so rapidly that eight shots are fired in a minute.—*Leipsic Illustrated.*



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Ruthven's patent (1839) for propelling vessels by jets of water thrown from submerged tubes, is undergoing experiment in an improved form by the British Admiralty. Dr. Franklin, when a boy, "pumped" himself across a pond, by getting astride of an old corporation milker which had been turned adrift, and working the handle. The present experiments are to determine whether the *Waterwitch*, a new hydro-propulsion steamer, can pump herself along to better advantage than the *Viper*, of the same measurement, power, etc., can screw. The engineering press and profession in England appear to be quite unanimously opposed both to the theory and practice as thus far developed. The experiment is pronounced a total and inevitable failure, although not completed. The speed of both vessels varied but little from nine knots, but as the power indicated was not disclosed, no conclusion can be drawn from that fact. On the *Waterwitch*, a turbine wheel is propelled by the engines, in the center of a water chamber in the hold which is kept full through a gate in the bottom and vented through pipes in the sides, turned aft. Another set of pipes turn forward, so that the pilot can with his own hand directly reverse the motion, regulate the speed, or by operating the aft pipes on one side with the forward pipes on the other, steer in any direction or turn the vessel stationary on her center.

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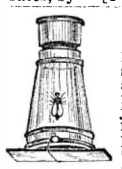

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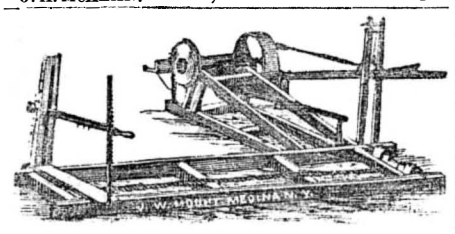

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